


# Year 4 Computing Curriculum

	Autumn 1	Autumn 2
Curriculum focus	Digital and Online Safety	Searching the Web
Computing Strand	Information Technology	Information Technology
Curriculum links	<ul style="list-style-type: none"> <li>use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content</li> <li>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 and information</li> <li>use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</li> </ul>	<ul style="list-style-type: none"> <li>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</li> <li>use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content</li> <li>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 and information</li> <li>use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact</li> </ul>
Prior learning	<p>This unit builds on important online safety messages that will be delivered in Key Stage 1. Students cover a range of age-appropriate online safety and digital literacy themes in <b>Keeping safe and exploring technology</b> (Year 1) and <b>Keep safe and create</b> (Year 2). In <b>Digital Literacy and Online Safety</b> (Year 3) students learn about screen time issues, privacy, digital footprints, online communities, online bullying and copyright principles.</p>	<p>This unit gives important lessons on safe and effective searching online. It covers what a search engine is and tips and tricks for using them effectively, safe and effective image searching, evaluating what we see online for authenticity and design and searching maps. It also builds on work in our Key Stage 1 unit <b>Finding and presenting information</b>, where students learn about techniques to search for information and learn how to present it in graphs and charts. The safe searching skills covered in these lessons are key skills for all future learning in Key stage 2 and beyond where digital research is required.</p>
Key vocabulary	<ul style="list-style-type: none"> <li><b>Advertising</b> - messages or photos that are made to persuade someone to buy a certain product</li> <li><b>Alter</b> - to change the way something looks, sometimes using a computer or other digital tools</li> <li><b>Assumption</b> - something that someone thinks is true, but in reality, may or may not be</li> <li><b>Community</b> - a group of people who share the same interests or goals</li> <li><b>Digital citizen</b> - someone who uses technology responsibly to learn, create, and participate</li> <li><b>Empathy</b> - to imagine the feelings that someone else is experiencing</li> <li><b>Identity</b> - different parts of your culture, experiences, and</li> </ul>	<ul style="list-style-type: none"> <li><b>Algorithm</b> - an unambiguous procedure or precise step-by-step guide to solve a problem or achieve a particular objective. A set of instructions for achieving a goal or solving a problem.</li> <li><b>Artificial Intelligence (AI)</b> - technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy</li> <li><b>Attribute</b> - giving credit to the person who created something, such such as listing the author's name and date, or a citation.</li> <li><b>Chatbot</b> - An AI program designed to make the user feel like they are having a natural conversation (chat) with another human. They are often used as an interface to offer help and support on websites and for generative AI prompts, on sites such as ChatGPT.</li> </ul>

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interests that make you unique


- **Interpret** - to understand something based on our point of view
- **Norm** - a way of acting that everyone in a community agrees to
- **Password** - a secret string of letters, symbols, and numbers that you can use to restrict who can access something digital
- **Persuade** - to cause someone to believe something
- **Photo retouching** - digital alteration of a photo to enhance the way someone looks (removing of wrinkles, clearing of skin, changing their body, etc.)
- **Phrase** - a group of words that go together and are easy to remember
- **Pledge** - a promise or an oath that one makes
- **Responsibility** - a duty you have to yourself or others
- **Selfie** - a picture you take of yourself, usually with a phone
- **Symbol** - a character other than a number or letter, such as #, !, or @.
- **Username** - a name you create to sign into a website, app, or game

- **Cookies** - Small text files stored on a computer that keep track of what a person does on a website.
- **Copyright** - legal protection that a creators have over the things they create.
- **Digital content** - any media created, edited or viewed on a computer, such as text (including the hypertext of a web page), images, sound, video (including animation), or virtual environments, and combinations of these.
- **Evaluation** - Making judgements (a computational thinking concept)
- **Generative AI** - deep-learning models that can generate high-quality text, images, and other content based on the data they were trained.
- **Inference** - an educated guess based on evidence
- **Internet** - the global collection of computer networks and their connections, all using shared protocols (TCP/IP) to communicate.
- **Internet Service Provider (ISP)** - a company that lets you connect to the Internet via their system.
- **License** - a clear way to define the type of copyright creative work has so others know how they can use it
- **Online** - using a digital device to visit a website or app that makes use of the internet.
- **PageRank** - A way of ordering the results of a search on the internet.
- **Prompt** - A query used on a generative AI chatbot to generate content.
- **Search** - to identify data that satisfies one or more conditions, such as web pages containing supplied keywords, or files on a computer with certain properties.
- **Server** - A server is a computer that serves up information to other computers on a network.
- **Services** - programs running on computers, typically those connected to the internet, which provide functionality in response to requests.
- **Web browser** - A web browser, or simply "browser," is an application used to access and view websites.
- **World Wide Web** - a service provided by computers connected to the internet (web servers), in which pages of hypertext (web pages) are transmitted to users; the pages typically include links to other web pages and may be generated by programs automatically.

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<p>Substantive concepts</p>	<ul style="list-style-type: none"> <li>● Examine both in-person and online responsibilities.</li> <li>● Describe the Rings of Responsibility as a way to think about how our behavior affects ourselves and others.</li> <li>● Identify examples of online responsibilities to others.</li> <li>● Define the term "password" and describe a password's purpose.</li> <li>● Understand why a strong password is important.</li> <li>● Practice creating a memorable and strong password.</li> <li>● Consider how posting selfies or other images will lead others to make assumptions about them.</li> <li>● Reflect on the most important parts of their unique identity.</li> <li>● Identify ways they can post online to best reflect who they are.</li> <li>● Define what a community is, both in person and online.</li> <li>● Explain how having norms helps people in a community achieve their goals.</li> <li>● Create and pledge to adhere to shared norms for being in an online community.</li> <li>● Understand that it's important to think about the words we use, because everyone interprets things differently.</li> <li>● Identify ways to respond to mean words online, using S-T-O-P.</li> <li>● Decide what kinds of statements are OK to say online and which are not.</li> <li>● Recognise that photos and videos can be altered digitally.</li> <li>● Identify different reasons why someone might alter a photo or video.</li> <li>● Analyze altered photos and videos to try to determine why.</li> </ul>	<ul style="list-style-type: none"> <li>● To explain in simple terms what a search engine is</li> <li>● To understand how search results are selected and ranked, including that search engines use 'web crawler programs'.</li> <li>● To stay safe when going online and to know what to do if they have a problem</li> <li>● To stay safe when going online and to know what to do if they have a problem</li> <li>● To use a variety of tools when searching for images</li> <li>● To understand and be respectful of copyright when searching for images</li> <li>● To stay safe when going online and to know what to do if they have a problem</li> <li>● Makes judgements about the reliability and validity of digital content</li> <li>● To research and validate information on website</li> <li>● To stay safe when going online and to know what to do if they have a problem</li> <li>● Make and explain judgements about the design of digital content</li> <li>● To compare and contrast different types of maps</li> <li>● To use a variety of tools in digital maps to find and explore places</li> <li>● To stay safe when going online and to know what to do if they have a problem</li> <li>● To understand and explain artificial intelligence (AI) in simple terms</li> <li>● To create clear and precise prompts for a generative AI chatbot</li> <li>● To understand possible negative uses of generative AI</li> </ul>
<p>What comes next?</p>	<p>The digital literacy content in this unit will form foundations to look at similar themes in even more depth with our <b>Digital Literacy and online safety</b> units for <b>Year 5</b>, and <b>Year 6</b>.</p>	<p>The safe searching content in this unit will be built upon in our <b>Digital Literacy and online safety</b> units for <b>Year 4</b>, <b>Year 5</b>, and <b>Year 6</b>. The IT content in this unit is built upon in the rest of Key Stage 2, where students will go into more depth about what makes computers work and what the internet is in our units <b>What is a computer?</b> and <b>Inside the internet</b>. Their research and evaluation skills are also made use of in <b>Building collaborative websites</b> and <b>Creating instructional videos</b>.</p>

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	Spring 1	Spring 2
Curriculum focus	Programming Scratch maze games	Getting Started with a Crumble
Strand	Computer Science	Computer Science
Curriculum links	<ul style="list-style-type: none"> <li>design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> <li>use sequence, selection, and repetition in programs; work with variables and various forms of input and output</li> <li>use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</li> </ul>	<ul style="list-style-type: none"> <li>design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> <li>use sequence, selection, and repetition in programs; work with variables and various forms of input and output</li> <li>use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</li> </ul>
Prior learning	<p>This unit builds on the computer science units with a programming focus from Key Stage 1: <b>Action algorithms</b> and <b>Programming direction</b> (Year 1) and <b>Programming with Scratch Jr</b> and <b>Programming with Logo</b> (Year 2), as well as the Year 3 units <b>Getting Started with Kodu</b> and <b>Animation with Scratch</b>.</p>	<p>This unit builds on the computer science units with a programming focus from Key Stage 1: <b>Action algorithms</b> and <b>Programming direction</b> (Year 1) and <b>Programming with Scratch Jr</b> and <b>Programming with Logo</b> (Year 2), as well as the Year 3 units <b>Getting Started with Kodu</b> and <b>Animation with Scratch</b>, Year 4 units <b>Programming Scratch maze games</b> and <b>Kodu sports</b> and Year 5 unit <b>Building retro games: Pick a project</b> which, between them cover key programming concepts such as sequence, selection, repetition and working with variables</p>
Key vocabulary	<ul style="list-style-type: none"> <li><b>Abstraction</b> - Removing unnecessary detail to help you solve a problem (a computational thinking concept)</li> <li><b>Algorithm</b> - an unambiguous procedure or precise step-by-step guide to solve a problem or achieve a particular objective. A set of instructions for achieving a goal or solving a problem.</li> <li><b>Block</b> - a ‘chunk’ of programming or a particular graphic block or piece found in a graphical programming language such as Scratch. Blocks linked together are called a script in Scratch. To find out what a block does, right-click on it, then select help from the pop-up menu.</li> <li><b>Blocks Palette</b> - (in Scratch) - the library of blocks in most graphical programming languages.</li> <li><b>Command</b> - a step or line of programming.</li> <li><b>Coordinate</b> (noun) - Cartesian coordinates are a set of values that show an exact position. In a 2D environment, such as on a graph, two axis are needed, each with an equal</li> </ul>	<ul style="list-style-type: none"> <li><b>Abstraction</b> - Removing unnecessary detail to help you solve a problem (a computational thinking concept)</li> <li><b>Algorithm</b> - an unambiguous procedure or precise step-by-step guide to solve a problem or achieve a particular objective. A set of instructions for achieving a goal or solving a problem.</li> <li><b>Block</b> - a ‘chunk’ of programming or a particular graphic block or piece found in a graphical programming language such as Scratch. Blocks linked together are called a script in Scratch. To find out what a block does, right-click on it, then select help from the pop-up menu.</li> <li><b>Blocks Palette</b> - The library of blocks in most graphical programming languages.</li> <li><b>Command</b> - a step or line of programming.</li> <li><b>Crumble</b> - A small electronic controller board, produced by Redfern Electronics. A Crumble can be connected to a variety of components such as LEDs, motors, buzzers and sensors by easily attaching them with crocodile clip wires. The Crumble</li> </ul>

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number scale. The X axis represents the horizontal position of a point, the Y axis represents the vertical position of a point. Coordinates in a 3D environment require a third axis (Z) which represents depth. Coordinates can be commonly used in coding to position objects (sprites in Scratch) within a program's visual environment.

- **Costume** - The costume is the appearance of a sprite on the screen. These are usually editable. A sprite can often have multiple costumes that are changed by programming the sprite.
- **Debug** - to detect and correct the errors in a computer program.
- **Decomposition** - Breaking a problem down into smaller parts (a computational thinking concept)
- **Execute** - to follow a series of instructions. The computer or robot follows the instructions in order to complete the program.
- **Input** - data provided to a computer system, such as via a keyboard, mouse, microphone, camera or physical sensors. Information which is received by the computer from a keyboard, mouse or sensor e.g. pressing the left mouse button or space bar creates an input.
- **Logical reasoning** - a systematic approach to solving problems or deducing information using a set of universally applicable and totally reliable rules.
- **Output** - the information produced by a computer system for its user, typically on a screen, through speakers or on a printer, but possibly through the control of motors in physical systems. Also an action performed by the computer e.g. switching on a light, moving a turtle or sprite across the screen.
- **Program** - (noun) A sequence of instructions written to perform a specified task on the computer
- **Program** - (verb) To give a series of instructions to a machine so that it will perform a task automatically
- **Repetition** (also known as 'Loop' or 'Iteration') - a programming construct in which one or more instructions are repeated, perhaps a certain number of times, until a condition is satisfied or until the program is stopped.
- **Script** - (In Scratch) blocks are snapped together into stacks, called scripts. When you click on a script, Scratch runs the blocks from the top of the script to the bottom. You can program sprites and the stage using scripts.
- **Selection** - 'when things happen' - A programming


then connects to a computer via USB where code can be written to control the Crumble and the components connected to it.

- **Debug** - to detect and correct the errors in a computer program.
- **Decomposition** - Breaking a problem down into smaller parts (a computational thinking concept)
- **Execute** - to follow a series of instructions. The computer or robot follows the instructions in order to complete the program.
- **Input** - data provided to a computer system, such as via a keyboard, mouse, microphone, camera or physical sensors. Information which is received by the computer from a keyboard, mouse or sensor e.g. pressing the left mouse button or space bar creates an input.
- **Logical reasoning** - a systematic approach to solving problems or deducing information using a set of universally applicable and totally reliable rules.
- **Output** - the information produced by a computer system for its user, typically on a screen, through speakers or on a printer, but possibly through the control of motors in physical systems. Also an action performed by the computer e.g. switching on a light, moving a turtle or sprite across the screen.
- **Polarity** - Electrical polarity (positive and negative) is the direction of current flow in an electrical circuit. Some components in a circuit, such as batteries and LEDs need to be inserted correctly so the electricity can flow through them in the correct direction, otherwise they do not work.
- **Program** - A sequence of instructions written to perform a specified task on the computer
- **Repetition** (also known as 'Loop' or 'Iteration') - a programming construct in which one or more instructions are repeated, perhaps a certain number of times, until a condition is satisfied or until the program is stopped.
- **Script** - Blocks are snapped together into stacks, called scripts. When you click on a script, Scratch runs the blocks from the top of the script to the bottom. You can program sprites and the stage using scripts.
- **Selection** - 'when things happen' - A programming construct in which the instructions that are executed are determined by whether a particular condition is met.
- **Sequence** - to place programming instructions in order, with each executed one after the other.
- **Sparkle** - A bright RGB (red, green, blue) LED light, designed

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	<p>construct in which the instructions that are executed are determined by whether a particular condition is met.</p> <ul style="list-style-type: none"> <li>● <b>Sequence</b> - to place programming instructions in order, with each executed one after the other.</li> <li>● <b>Sprite</b> - A graphical object that can be controlled by programming.</li> <li>● <b>Stage</b> - (in Scratch) - the Stage is where you see your stories, games, and animations come to life.</li> <li>● <b>Variables</b> - a way in which computer programs can store, retrieve or change simple data, such as a score, the time left, or the user's name.</li> </ul>	<p>specially for the Crumble. Sparkles can be connected to a Crumble and controlled by code to set their colour and how they light up.</p> <ul style="list-style-type: none"> <li>● <b>Switch</b> - A switch is an input device that can send a message to your Crumble. Code can be written to detect when the switch is pressed, or not pressed, and make an output happen as a result, for example, an LED lighting up or a motor turning.</li> </ul>
<p>Substantive concepts</p>	<ul style="list-style-type: none"> <li>● To design an appropriate setting for a video game</li> <li>● To program the movement of a sprite</li> <li>● To understand and apply the use of coordinates when coding character movement</li> <li>● To understand and use conditions in programming</li> <li>● To understand and apply the use of coordinates when coding character movement</li> <li>● To debug a program, explaining errors you find and how to fix them</li> <li>● To understand and use variables</li> <li>● To add appropriate sounds to a coding project</li> <li>● Understand and use broadcasts as event triggers</li> <li>● To extend a video game by adding levels</li> <li>● Understand and use broadcasts as event triggers</li> <li>● To understand and use variables for different functions in game</li> <li>● Talk about how they made their program and justify the choice they made for both function and design.</li> <li>● Critically evaluate programs and say what they liked and what could be done to improve it.</li> </ul>	<ul style="list-style-type: none"> <li>● To identify and explain the parts in the Crumble starter set</li> <li>● To safely and accurately set up a Crumble and Sparkle LEDs</li> <li>● Detect and correct errors in algorithms and programs</li> <li>● To use iteration (loops) in a program.</li> <li>● To safely and accurately set up a Crumble and Sparkle LEDs</li> <li>● To understand, explain and apply conditions in a program using 'if then' and 'if then, else' statements.</li> <li>● Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</li> <li>● To create (and decode) coded messages by programming light sequences</li> <li>● Use sequence, selection, and repetition in programs and various forms of input and output.</li> <li>● use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and program.</li> <li>● Design and make and test objects or artefacts that successfully incorporate the Crumble controller and Sparkles to illuminate the object.</li> <li>● Design and make and test objects or artefacts that successfully incorporate the Crumble controller and motors to make the object move.</li> </ul>
<p>What comes next?</p>	<p>This unit supports all of the future computer science learning that the students will experience. Its content is built upon in the following units: <b>Programming Scratch maze games, Building retro games - pick a project and LEGO robotics</b>, in which the programming language of Scratch is also used with a variety of different applications and opportunities to learn and practise designing, writing, editing and improving programs for specific purposes.</p>	<p>Students will be able to apply the knowledge and skills learned in this unit with further programming lessons in Key Stage 2. <b>LEGO Robotics</b> (Year 5) again gives another opportunity for students to control physical systems, this time by building and controlling different types of robots. <b>Getting Started with the BBC micro:bit</b> gives them the experience of another micro-computer, a bit like the Crumble, but with greater possibilities for a wider range of coding projects.</p>

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	Summer 1	Summer 2
Curriculum focus	3D Design - Digital Modelling using SketchUp	Computational Thinking - Alien Attack
Strand	Computing Science	Computing Science
Curriculum links	<p>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 and information</p>	<ul style="list-style-type: none"> <li>design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> <li>use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</li> <li>use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.</li> </ul>
Prior learning	<p>This unit of work builds on elements of <b>Getting started with Kodu</b>, which, while primarily a computer science and programming unit, also requires students to work and create in a 3D environment and manipulate and control the user viewpoint and work on different planes. This unit introduces many unique 3D design skills, however, it also builds strongly on other artistic units of work they will have covered, such as <b>An introduction to digital art</b> (Year 1), where they learn to use shapes and line drawing tools, something which is replicated in a 3D environment with Sketchup in this unit.</p>	<p>This unit builds on the Key Stage 1 unplugged computer science unit <b>Action algorithms</b>. It examines computational thinking concepts through a series of problem solving lessons for the students. Through the unit, they will need to use and understand logic, evaluation, abstraction, pattern recognition, decomposition and algorithms.</p>
Key vocabulary	<ul style="list-style-type: none"> <li><b>3D</b> - (or 3-D) means three-dimensional, or having three dimensions. For example, a cube is three-dimensional; it is solid, and not thin like a piece of paper.</li> <li><b>3D modelling</b> - 3D modelling is a technique in computer graphics for producing a 3D digital representation of any object or surface.</li> <li><b>3D printing</b> - 3D printing is the action or process of making a physical object from a three-dimensional digital model, typically by laying down many thin layers of a material in succession.</li> <li><b>Alter</b> - To change the way something looks, sometimes using a computer or other digital tools</li> <li><b>CAD</b> - Computer aided design or CAD is an important industry within the tech world.</li> <li><b>Digital content</b> - Any media created, edited or viewed on a computer, such as text (including the hypertext of a web</li> </ul>	<ul style="list-style-type: none"> <li><b>Abstraction</b> - Removing unnecessary detail to help you solve a problem (a computational thinking concept)</li> <li><b>Algorithm</b> - an unambiguous procedure or precise step-by-step guide to solve a problem or achieve a particular objective. A set of instructions for achieving a goal or solving a problem.</li> <li><b>Binary</b> - Binary is the language computers use. It is a series of 1s and 0s and is also used in mathematics.</li> <li><b>Command</b> - a step or line of programming.</li> <li><b>Cyberbullying</b> - using digital devices, sites, and apps to intimidate, harm, and upset someone</li> <li><b>Debug</b> - to detect and correct the errors in a computer program.</li> <li><b>Decomposition</b> - Breaking a problem down into smaller parts (a computational thinking concept)</li> <li><b>Digital footprint</b> - a record of what you do online, including the sites you visit and the things you post; it can also include things</li> </ul>

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	<p>page), images, sound, video, or virtual environments, and combinations of these.</p> <ul style="list-style-type: none"> <li>● <b>Edit</b> - To change, add or remove elements in a piece of work (usually to improve it).</li> <li>● <b>Export</b> - The opposite of importing and a computing command that usually means saving or sending a file, or part of a file, to a specific new location.</li> <li>● <b>Import</b> - A computing command that usually means allowing a user to bring in a file, or part of a file into another application so they can be combined.</li> <li>● <b>Save</b> - To store a piece of work in a computer's memory so that it can be recalled at a later time.</li> <li>● <b>Simulation</b> - Using a computer to model the state and behaviour of real-world (or imaginary) systems, including physical and social systems; an integral part of most computer games.</li> <li>● <b>Software</b> - Computer programs, including both application software (such as office programs, web browsers, media editors and games) and the computer operating system.</li> </ul>	<p>that others post that involve you.</p> <ul style="list-style-type: none"> <li>● <b>Evaluation</b> - Making judgements (a computational thinking concept).</li> <li>● <b>Inference</b> - an educated guess based on evidence</li> <li>● <b>Logical reasoning</b> - a systematic approach to solving problems or deducing information using a set of universally applicable and totally reliable rules.</li> <li>● <b>Online</b> - using a digital device to visit a website or app that makes use of the internet.</li> <li>● <b>Output</b> - the information produced by a computer system for its user, typically on a screen, through speakers or on a printer, but possibly through the control of motors in physical systems.</li> <li>● <b>Patterns</b> - Spotting and using similarities to solve problems (a computational thinking concept)</li> <li>● <b>Personal information</b> - information about you that cannot be used to identify you because it is also true for many other people (e.g. your hair colour or the city you live in)</li> <li>● <b>Private information</b> - information about you that can be used to identify you because it is unique to you (e.g. your full name or your address)</li> <li>● <b>Program</b> - A sequence of instructions written to perform a specified task on the computer</li> <li>● <b>Repetition</b> (also known as '<b>Loop</b>' or '<b>Iteration</b>') - a programming construct in which one or more instructions are repeated, perhaps a certain number of times, until a condition is satisfied or until the program is stopped.</li> <li>● <b>Sequence</b> - to place programming instructions in order, with each executed one after the other.</li> </ul>
<p>Substantive concepts</p>	<ul style="list-style-type: none"> <li>● Navigate a 3D environment successfully</li> <li>● Create simple 3D models</li> <li>● Become familiar with some of the simple drawing tools in Sketchup</li> <li>● Create detailed 3D models of furniture</li> <li>● Use the referencing tools in Sketchup to help keep elements in proportion</li> <li>● Use a range of simple drawing tools in Sketchup</li> <li>● Apply colour and materials to a 3D model</li> <li>● Create a detailed 3D building model</li> <li>● Create and use components in a Sketchup model</li> <li>● Apply realistic colour and materials to a 3D model</li> <li>● Design buildings that fit a particular architectural theme or period in history</li> </ul>	<ul style="list-style-type: none"> <li>● To understand what computational thinking is</li> <li>● To recognise and apply computational thinking concepts and approaches to solve problems.</li> <li>● To understand that binary code can represent many things</li> <li>● To explain how images are converted into binary code and vice versa</li> <li>● To recognise and apply computational thinking concepts and approaches to solve problems.</li> <li>● To use logic and reasoning to evaluate digital content.</li> <li>● To understand and explain how to stay safe online.</li> <li>● To recognise and apply computational thinking concepts and approaches.</li> <li>● To recognise and apply computational thinking concepts and approaches to solve problems.</li> </ul>

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- Use more advanced building techniques such as referencing, follow me, components and grouping

- To collaborate and communicate effectively with team members
- To understand that encryption is a way to keep data private.
- To encode and decode Morse code messages
- To recognise and apply computational thinking concepts and approaches to solve problems.
- To give precise, unambiguous instructions in an algorithm
- To detect and correct errors in algorithms
- To recognise and apply computational thinking concepts and approaches to solve problems.

## What comes next?

Students will apply the skills of creating in a virtual 3D environment in the Year 5 unit **Kodu Sports**, which combines coding with 3D digital design and supports some of the skills learned in this unit. They will also extend their digital creative skills in **Building Collaborative Websites** and **Manipulating Sound** (both Year 5) and **Creating Instructional Videos** and **Manipulating Images** (both Year 6). In these units, they will combine the use of text, images, sound and video and learn how to edit and combine these various elements.

The digital literacy content in this unit will be built upon in our **Digital Literacy and online safety** units for **Year 4, Year 5, and Year 6**.

The IT content in this unit will be built upon in **What is a computer?** where students revisit binary data and how it can be converted to represent anything on a computer, and also in **Inside the internet**(Year 6). The computational thinking skills learned will also be applied in all of our programming units **Building retro games - pick a project** (Year 5), **Getting started with the BBC micro:bit** (Year 6), **LEGO robotics** (Year 5) and unit **Getting started with Crumble**.