Year 6 Computing Curriculum

	Autumn 1	Autumn 2
Curriculum focus	Digital Literacy and Online Safety	Spreadsheet Masters
Computing Strand	**Digital Literacy**	**Information Technology**
Curriculum links	• use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content • 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 • use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.	• design, write and debug programs that accomplish specific goals, • use logical reasoning to explain how some simple algorithms work and to detect and correct errors • 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
Prior learning	This unit builds on important online safety messages from Key stage 1 (Keeping safe and exploring technology and Keep safe and create) and more recently, our Digital Literacy and Online Safety units for Year 3, Year 4 and Year 5. In those units, students learn about screen time issues, privacy, digital footprints, online communities, online bullying, copyright principles, our responsibilities to others online, passwords, their own online identities, media choices and fake imagery.	This unit builds directly on the Year 3 unit Databases, where spreadsheets are used in a simple way, where the focus is on collecting, sorting and searching data. The use of spreadsheet formulas and conditional formatting in this unit is supported by most of our coding units of work. Formulas are a type of algorithm to achieve specific goals, and conditions are added to the code to decide what happens and when it happens. This is referred to as selection in the national curriculum objectives.
Key vocabulary	• **Advertising** - messages or photos that are made to persuade someone to buy a certain product • **Article** - A written story in a newspaper, magazine, or online news site • **Avatar** - An image or character that represents a person online • **Balance** - All of the parts are in the correct -- though not necessarily equal -- proportions • **Benefit** - Something positive that results from a situation • **Bias** - An unfair belief about a person or group based on a stereotype • **Bully** - The person who is doing the bullying • **Bullying** - Unwanted and aggressive verbal, social, or physical behaviour towards another	• **Ascending** - When data is sorted it can be arranged in a list. • **Cell** - A spreadsheet is a grid and each 'square' is a cell. When you click in a cell and highlight it, it is known as the active cell. • **Cell reference** - Individual cells can be identified using the column (letter) and row (number) labels. For example A3, B26 or E251. • **Chart** - A graphical representation of data in a worksheet. • **Column** - A sheet is made up of columns, labelled with letters. These are vertical (run top to bottom) and are labeled at the top of the grid. • **Conditional formatting** - A spreadsheet tool that will change the appearance of a cell if the contents match a certain criteria. • **Criteria** - This is a set of rules or judgements that can be made

Year 6 Computing Curriculum

	• **Bystander** - Someone who sees a bullying or cyberbullying situation, but doesn't do anything to stop it • **Clickbait** - An image or headline that tries to get you to click on it, usually for advertising purposes • **Commercial** - Intended to make money • **Curiosity Gap** - The desire people have to figure out missing information • **Cyberbullying** - using digital devices, sites, and apps to intimidate, harm, and upset someone • **Digital media** - information that comes to us through the internet, often through a tablet, smartphone, or laptop • **Empathy** - To imagine the feelings that someone else is experiencing • **Gender stereotypes** - Oversimplified ideas about how women and men are or should be • **Headline** - The title of an article, usually printed in big, bold letters at the top • **Media** - all of the ways that large groups of people get and share information • **Media balance** - using media in a way that feels healthy and in balance with other life activities • **Media choices** - time spent watching, listening to, reading or creating media • **News** - New information about recent or important events • **Personal information** - information about you that cannot be used to identify you because it is also true for many other people • **Private information** - information about you that can be used to identify you because it is unique to you • **Risk** - Something negative or dangerous that could come from a situation • **Target** - The person who is on the receiving end of the bullying • **Upstander** - a person who supports and stands up for someone else	to analyse data. • **Data** - Data is raw, unorganised facts that need to be processed. • **Data set** - A collection of data that can be analysed using a spreadsheet or other software. • **Descending** - When data is sorted it can be arranged in a list. • **Format** - Arranging the contents of the cell to appear in a chosen way e.g. changing the font, size or colour. • **Formula** - A sum (or other mathematical statement) that can be entered into a cell. • **Information** - Information is organised or presented data. Information gives context to data to make it useful. 2 apples, 2cm, 2 years old are all examples of information. • **Label** - Text (words or numbers) that are entered into a cell that will not be used in a formula. • **Row** - A sheet is made up of rows, labelled with numbers. These are horizontal (run left to right) and are labeled at the left of the grid. • **Sort** - Arranging data in a particular order. • **Tab** - Each sheet in a workbook will have its own tab at the bottom of the screen. • **Workbook** - When spreadsheet software is opened the whole document is called a workbook. • **Worksheet** - Each page of a spreadsheet is called a worksheet. A workbook can be made up of several sheets
Substantive concepts	• Reflect on how balanced chn are in their daily lives. • Consider what "media balance" means, and how it applies to chn. • Create a personalised plan for healthy and balanced media use. • Define "the curiosity gap." • Explain how clickbait uses the curiosity gap to get your attention. • Use strategies for avoiding clickbait.	• Explain what a spreadsheet is; • Describe how a spreadsheet could be used by someone at work; • Label the different areas of a spreadsheet using the correct vocabulary; • Create simple formulae in a spreadsheet. • Recall features of a spreadsheet • Use cell references to complete formulae • Use spreadsheets to complete formulae quickly and easily • Use a spreadsheet to sort data quickly

Year 6 Computing Curriculum

	• Define "gender stereotype" and describe how they can be present online. • Describe how gender stereotypes can lead to unfairness or bias. • Create an avatar and a poem that show how gender stereotypes impact who they are. • Compare and contrast different kinds of online-only friendships. • Describe the benefits and risks of online-only friendships. • Describe how to respond to an online-only friend if the friend asks something that makes them uncomfortable. • Recognise similarities and differences between in-person bullying, cyberbullying, and being mean. • Empathise with the targets of cyberbullying. • Identify strategies for dealing with cyberbullying and ways they can be an upstander for those being bullied. • Understand the purposes of different parts of an online news page. • Identify the parts and structure of an online news article. • Learn about things to watch out for when reading online news pages, such as sponsored content and advertisements.	• Recall features of a spreadsheet • Use a set of data in a spreadsheet to create an appropriate chart • Use data in a spreadsheet to answer a set of questions • Use information presented in a chart to answers questions • Use tools in a spreadsheet to help someone understand the information more quicklyCreate a spreadsheet to test maths facts • Use Conditional formatting to mark the questions
What comes next?	The digital literacy content in this unit will be built upon in Key Stage 3.	The application and use of spreadsheets will continue in Key Stage 3 and beyond, as students apply the skills learned here to projects such as Making the News in Year 7 and Planning the Festival in Year 8. They will need to collect and analyse data for a variety of purposes.

Year 6 Computing Curriculum

	Spring 1	Spring 2
Curriculum focus	Getting started with the BBC micro:bit	Manipulating Images
Strand	**Computing Science**	**Information Technology**
Curriculum links	• design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts • use sequence, selection, and repetition in programs; work with variables and various forms of input and output • use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs • 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	• 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
Prior learning	• This unit builds on the computer science units with a programming focus from Key Stage 1: Action algorithms and Programming direction (Year 1) and Programming with Scratch Jr and Programming with Logo (Year 2), as well as the Year 3 units Getting Started with Kodu and Animation with Scratch, Year 4 units Programming Scratch maze games and Kodu sports and Year 5 unit Building retro games: Pick a project which, between them cover key programming concepts such as sequence, selection, repetition and working with variables. Year 5 unit LEGO Robotics also supports this learning.	• This unit builds strongly on other artistic units of work students will have covered, such as An introduction to digital art (Year 1), where they learn to use shape and line drawing tools. But there is a really strong progression of skills from Key Stage 2 units Digital Imagery: Patterns in Nature (Year 3) where students first experience image editing skills such as selecting, editing and combining images on multiple layers, as well as applying effects to images. In 3D Design (Year 4), Getting Started with Kodu (Year 3) and Kodu sports (Year 4), students experience working in a virtual 3D environment to create 3D models, skills which are again applied here as they create virtual 3D sculptures.
Key vocabulary	• **Abstraction** - Removing unnecessary detail to help you solve a problem • **Algorithm** – an unambiguous procedure or precise step-by-step guide to solve a problem or achieve a particular objective • **Block** – a 'chunk' of programming or a particular graphic block or piece found in a graphical programming language • **Command** – a step or line of programming. • **Coordinate** - a set of values that show an exact position.	• **Alter** - to change the way something looks, sometimes using a computer or other digital tools. • **Attribute** - giving credit to the person who created something, such such as listing the author's name and date, or a citation. • **Copyright** - legal protection that a creators have over the things they create. • Digital content – any media created, edited or viewed on a computer • **Edit** - To change, add or remove elements in a piece of work

Year 6 Computing Curriculum

	• **Debug** – to detect and correct the errors in a computer program. • **Decomposition** - Breaking a problem down into smaller parts • **Execute** – to follow a series of instructions • **Input** – data provided to a computer system, such as via a keyboard, mouse, microphone, camera or physical sensors • **Logical reasoning** – a systematic approach to solving problems or deducing information using a set of rules • **Output** – the information produced by a computer system for its user • **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. • **Selection** – 'when things happen' • **Sequence** – to place programming instructions in order, with each executed one after the other. • **Sprite** – A graphical object that can be controlled by programming.	(usually to improve it). • **Evaluation** - Making judgements • **Export** - 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. • **Hue** - A colour or shade. • **Intellectual property** - the ownership of something you create, giving you a right to how others use it. • **Import** - 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. • **Layer** - In sound, photo or video editing terminology, layering is the stacking of media elements on top of each other, or in a project timeline • **Photo retouching** - digital alteration of a photo to enhance the way someone looks • **Saturation** - The intensity of a colour, how strong or washed out it is. • **Save** - To store a piece of work in a computer's memory so that it can be recalled at a later time. • **Search** – to identify data that satisfies one or more conditions • **Software** – computer programs, including both application software (such as office programs, web browsers, media editors and games) and the computer operating system. • **Web browser** - an application used to access and view websites.
Substantive concepts	• To create simple programs to control the LED matrix on the micro:bit • To edit and adapt simple programs on the micro:bit • To download, load and test the .hex file on the micro:bit. • To create simple programs to control the LED matrix on the micro:bit • To understand inputs and outputs on a computer • To program the micro:bit's LED matrix to respond to different inputs • To understand inputs and outputs on a computer • Designs algorithms that use variables, and selection and arithmetic operators • Use logical reasoning to predict the behaviour of programs. Detects and corrects simple semantic errors i.e. debugging, in programs. • Build and program a physical game that utilises inputs and outputs. • Understand what conditional statements are, and why and	• To use a range of photo editing tools and techniques to create a pop art style image inspired by Andy Warhol's work • To effectively work with multiple layers in an image • To successfully use the lasso tool • To use a range of photo editing tools and techniques to create a pop art style image • To effectively work with multiple layers in an image • To successfully use the lasso tool to edit parts of an image • To successfully use the lasso, marquee and eraser tools to successfully combine a number of separate images into one. • To successfully work with layers when editing photos together. • To use colour and lighting effects to successfully merge separate images into one. • To develop familiarity with 3D modelling tools and techniques • To successfully work and navigate in a 3D digital environment • To sculpt and colour a detailed 3D model of an alien creature • To work independently with a range of 3D modelling tools and techniques

Year 6 Computing Curriculum

	when to use them in a program • Designs algorithms that use variables, and selection and arithmetic operators • Understand what conditional statements (selection) are, and why and when to use them in a program • Understand what variables are and why and when to use them in a program. • Learn how to create random outputs from a range of possibilities. • Understand what variables are and why and when to use them in a program. • Learn how to create, set and change a variable value within a micro:bit program. • Learn how to use the basic mathematical blocks for adding, subtracting, multiplying, and dividing variables.	• To create a 3D digital sculpture for a specific real life location • To combine images to superimpose a digital sculpture into a real life location • To successfully work with layers when editing photos together • To successfully use a range of photo editing tools to merge separate images into one
What comes next?	• Students will be able to apply the knowledge and skills learned in this unit with further programming units as they enter Key Stage 3. They will extend their use of block-based coding using a Raspberry Pi which, like the micro:bit, gives the opportunity to build and control physical systems with code. • Their experience is then extended to text-based coding languages like Python and Ruby.	• Students will apply some of the multimedia skills learned in this unit in Key Stage 3 through our multimedia project unit Making the News (Year 7). Planning the Festival (Year 8) also provide students with the opportunity to apply their digital making skills using video, images, text and sound.

Year 6 Computing Curriculum

	Summer 1	Summer 2
Curriculum focus	Programming Robots / LEGO Robotics	Creating Instructional Videos
Strand	Computing Science	Information Technology
Curriculum links	• design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts. • use sequence, selection, and repetition in programs; work with variables and various forms of input and output. • use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs. • 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.	• 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 • use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.
Prior learning	• This unit builds on the computer science units with a programming focus from Key Stage 1: Action algorithms and Programming direction (Year 1) and Programming with Scratch Jr and Programming with Logo (Year 2), as well as the Year 3 units Getting Started with Kodu and Animation with Scratch, Year 4 units Programming Scratch maze games and Kodu sports and Year 5 unit Building retro games: Pick a project.	• This unit builds directly on other multimedia units of work in • our scheme, most recently, Manipulating Sound (Year 5), • where students will also experience combining and editing lots • of multimedia elements (sound) on a timeline, skills which • relate directly to this unit where they do the same but combine • video, images, text and sound. Building Collaborative Websites (Year 5) also supports this unit with planning a multimedia project that combines a variety of digital artifacts, and Digital Imagery - Patterns in Nature (Year 4) gives them experience of image editing and combining multiple layers.
Key vocabulary	• **Abstraction** - Removing unnecessary detail to help you solve a problem (a computational thinking concept) • **Algorithm** – an unambiguous procedure or precise step-by-step guide to solve a problem or achieve a particular objective. • **Block** – a 'chunk' of programming or a particular graphic block or piece found in a graphical programming language such as Scratch. • **Blocks Palette** – the library of blocks in most graphical programming languages.	• **Annotate** - add notes to (a text or diagram) giving explanation or comment. • **Capture** - (in film or animation) To take a photograph or video recording. • **Digital content** – any media created, edited or viewed on a computer, such as text, images, sound, video (including animation), or virtual environments, and combinations of these (i.e. multimedia). • **Edit** - To change, add or remove elements in a piece of work (usually to improve it).

Year 6 Computing Curriculum

- **Command** – a step or line of programming.
- **Control** – using computers to move or otherwise change 'physical' systems. The computer can be hidden inside the system or 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.
- **Function** - A procedure/function is used in programming to break a complex task down into simple steps or sections.
- **Hardware** - Any part of your computer that has a physical structure, such as the keyboard, monitor or mouse. It also includes all of the computer's internal parts.
- **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.
- **Logic** - Predicting and analysing. Computational logic is used to allow a program to decide what to do and when.
- **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 though the control of motors in physical systems.
- **Patterns** - Spotting and using similarities to solve problems (a computational thinking concept)
- **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** – 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.
- **Robot** - a machine, especially one programmable by a computer, capable of carrying out a complex series of actions automatically.
- **Selection** – 'when things happen' - A programming

- **Export** - 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.
- **Frame** - A single drawing or image captured as a photograph in an animation or video.
- **Import** - 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.
- **Layer** - In sound or video terminology, layering is the stacking of media elements in a project timeline to enable playback of multiple elements simultaneously.
- **Narrate** - deliver a spoken commentary to accompany (a film, broadcast, piece of music, etc.)
- **Timeline** - a graphical representation of a period of time. Used in video and sound editing to order and arrange the separate elements of a project.

Year 6 Computing Curriculum

	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.	
Substantive concepts	• Understand and explain what a robot is and how they are used • Design and write algorithms to control a robot • Understand and change variables to change the movements of a robot • Write algorithms to control the movements of a robot • Debug algorithms to solve problems • Understand different types of turn and program a robot to perform them. • Write algorithms to control the movements of a robot • Change variables to make things happen • Use a loop to repeat sections of an algorithm • Write algorithms to control the movement of a robot • Write algorithms to control motors that operate moving and lifting attachments on a robot • Debug algorithms to solve problems • Understand what inputs and outputs are • Use sensors to affect a robot's actions • Create conditional statements in an algorithm • Design and create a problem for a robot to solve • Design, write and debug algorithms to solve a robot problem	• To understand and explain the features of an instructional video. • To critically evaluate existing instructional videos. • To work successfully in a team to plan an instructional video. • To create a clear and factually accurate script for an instructional video. • To critically evaluate another group's script for an instructional video. • To experiment with text, image and formatting tools in presentation software. • To add text and images to a presentation appropriate for the audience. • To add consistent formatting throughout a presentation. • To record an instructional video guide in small sections. • To cut, trim and order video clips effectively to create a video project. • Critically evaluate your own and others' video, refining for a given audience or task. • Upload and share a video with a group using collaborative web tools.
What comes next?	• Getting started with the BBC micro:bit (Year 6) and optional unit Getting started with Crumble provide further opportunities for students to write code to control physical systems while widening their knowledge and experience of programming with other block-based coding languages. Conditional formatting in Spreadsheet masters also applies similar principles as the conditions (selection) used when programming the robot's sensors.	• Students will apply some of the multimedia skills learned in this unit in Manipulating Images (Year 6), where they will extend their skills in image editing by creating and capturing images and combining layers to create new images. Our multimedia project units Making the News (Year 7) and Planning the Festival (Year 8) also provide students with the opportunity to apply their digital making skills using video, images, text and sound.