Computing - Whole School Progression Map

Discovery MAT – Computing Curriculum Statement

Quotes that guide us:
'Alan Turing gave us a mathematical model of digital computing that has completely withstood the test of time. He gave us a very, very clear description that was truly prophetic.' George Dyson
'We need technology in every classroom and in every student and teacher's hand, because it is the pen and paper of our time, and it is the lens through which we experience much of our world." David Warlick

Why is it important to teach Computing? (Intent)
A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with the STEM subjects Mathematics, Science, and Design and Technology, which as a school driven by the STEM skills, is incredibly important. The core of Computing is Computer Science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate which in this growing digital world will equip the children for their future workplace. They will have the skills to make connections in what they have learnt, and will be supported to be resilient, self-evaluate, and develop a desire to learn as they go to their next stage of learning.

Key Concepts:
- That computers can make things more efficient and easier.
- The internet is a powerful tool when used safely and the importance of being a critical thinker when using the internet and 'not believing everything you read' – to be taught through National Online Safety.
- The importance of coding in the modern age.
- We aim for children to become responsible, competent, confident and creative users of information and communication technology.
- Children can develop, embed and extend their Computing knowledge through unplugged strategies which are then applied to programmes and applications allowing them to reflect and build on prior learning knowledge.

Curriculum Design (Implementation)
Our Computing curriculum provides children with the opportunity to engage with computing as a subject through both explicit and discreet computing lessons linked with themes across the curriculum. Children are also encouraged to utilise computing resources across other areas of the curriculum to ensure they become fluent users of a range of resources. The curriculum is broken down through use of a progression map, encompassing the skills and knowledge needed to fulfil the needs of the National Curriculum statements using a small steps pedagogy, developed through Teaching and Learning Pedagogy developed through use of Rosenshine's Principles. Every lesson is individually planned so that it can be effectively taught and so it meets the needs of all our pupils, ensuring that prior knowledge is built on utilising both unplugged and plugged methods of teaching. Staff use units detailed on the Computing and E-Safety progression map linked directly with the National Curriculum to make links with their curriculum topics to develop knowledge and skills associated with Computing. Each lesson has a learning outcome and this is often part of their STEM destination. Having discreet lessons supports children to develop depth in their knowledge and skills over the duration of primary learning curriculum. Where appropriate, meaningful links will be made between the computing curriculum at the wider curriculum through the termly thematic planning. During computing lessons, the children will use either the iPads or the Chromebooks/laptops in order to access a range of apps and software. Discreet computing lessons will focus on the curriculum skills of information technology and digital literacy. In addition, children have opportunities to engage with Computing Rich Experiences such as Safer Internet Day and Hour of Code to develop their knowledge of Computing and E-safety outside of their planned curriculums.

Our Computing curriculum gives children the opportunity to:
- **To develop knowledge and skills linked with the three aspects of the Computing Curriculum (Computer Science, Information and Technology and Digital Literacy) in line with a progression map that utilises a range of software to build and extend on what they have already learned.**
- **Engage with rich experiences outside of the curriculum to enthuse children and develop resilience and the ability to be reflective, creative thinkers.**
- **To explore and tinker with a range of software to encourage them to take risks with their learning and develop problem solving skills.**
- **To develop and build on their knowledge of how to use computerised equipment and the internet safely, supported by the National Online Safety Platform which bring the whole school community together (pupils, staff and parents) to support learners.**

Knowledge Focused
Each class has a computing book to record any work completed not in curriculum books which acts as a record of their journey and as a resource to reactive and revisit learning. Learning journeys are sent home at the beginning of the term so parents can support learning at home. Thematic planning means that the children are making links across the curriculum, and therefore the learning is more likely to become embedded as is is revisited across the term. This also gives them the opportunity to apply what they have learnt. The school uses National Online Safety platform to teach online safety which is taught explicitly every term. Staff training is also provided throughout the year.

What we do well as a Trust (Impact)
Through a thematic approach, our Computing curriculum aims to give pupils the life-skills to enable them to embrace and utilise new technology in a socially responsible and safe. We are passionate about our children becoming autonomous users of computing technologies, gaining confidence and enjoyment from their activities. We want the use of technology to support learning across the entire curriculum. As well as being digitally literate and skilled users of technology, we are committed to developing them to use their STEM skills to be flexible, creative, collaborative, problem solvers and to use their inquiry skills to develop knowledge or solve problems. Microsoft Teams and E-schools had a huge positive impact during lockdown. The school provided technology (where needed) to enable all children to access remote learning. Teachers continue to build on prior knowledge utilising 'unplugged' teaching methods to extend children's knowledge which can then be applied confidently and fluently to technology. Regular monitoring with children shows that children are able to articulate what they have learnt not just from curriculum activities but that they can also related this to the theme that they have been learning about each term. The children have demonstrated their enthusiasm about using technology and how they have been able to use the technology outside of their computing lessons.

Computing - Whole School Progression Map

Computing National Curriulum & EYFS Framework		
EYFS	**Key Stage 1**	**Key Stage 2**
Despite computing not being explicitly mentioned within the Early Years Foundation Stage (EYFS) statutory framework, there are many opportunities for young children to use technology to solve problems and produce creative outcomes. As a Trust, we have defined specific outcomes which the children will have opportunities to experience and learn throughout the year. They also have access to the online safety platform to begin to think about navigating the online world safely.	**Pupils should be taught to:** • understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions • create and debug simple programs • use logical reasoning to predict the behaviour of simple programs • use technology purposefully to create, organise, store, manipulate and retrieve digital content • recognise common uses of information technology beyond school • use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.	**Pupils should be taught to:** • 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 • 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 • 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.

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Computing Aspects of the National Curriulum		
Computing Strand	**KS1**	**KS2**
Computer Science	Understanding what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions Create and debug simple programs Use logical reasoning to predict the behaviour of simple programs	Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs 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 Appreciate how search results are selected and ranked
Information Technology	Use technology purposefully to create, organise, store, manipulate and retrieve digital content	Use search technologies effectively Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a arrange of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information
Digital Literacy (including eSafety)	Recognise common uses of information technology beyond school Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies	Understand the opportunities networks offer for communication and collaboration Be discerning in evaluating digital content Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact

The table above shows the three strands that computing can be broken down into.
The National Curriculum statements have been sorted into each relevant strand.

Please note that the statements that occur in Digital Literacy are taught using the National Online Safety (NOS) resources from the National College Platform. Each block usually has three short lessons to complete, in some half terms Year groups have two blocks to complete, this happens when they do not have any other computing lessons that term.

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	Computing Curriulum Overview					
	All About Me	**Woodland Explorers**	**To Infinity and Beyond**	**Things that Grow**	**Trains, Planes and Cars**	**On the Seven Seas**
EYFS	Despite computing not being explicitly mentioned within the Early Years Foundation Stage (EYFS) statutory framework, there are many opportunities for young children to use technology to solve problems and produce creative outcomes. As a mat, we have defined specific outcomes which the children will have opportunities to experience and learn throughout the year. They also have access to the online safety platform to begin to think about navigating the online world safely. 1. Knows how to operate simple equipment, e.g. turns on a cd player, uses a remote control, operates a touchscreen device. 2. Shows an interest in technological toys with knobs or pulleys, or real objects such as cameras or mobile phones. 3. Shows skill in making toys work by pressing parts or lifting flaps to achieve effects such as sound, movement or new images. 4. Knows that information can be retrieved from computers 5. Completes a simple program on a computer. 6. Understands that retrieving information from the internet is safer to do with adult supervision.					
	Self-image and Identity	**Online Relationships and Online Reputation**	**Online Bullying**	**Managing Online Information and Healthy, Wellbeing and Lifestyle**	**Privacy and Security**	**Copyright and Ownership**
Y1	**Amazing Me**	**Weather Watchers** (Use Paint independently to create a seasonal picture) PAINT TOOL COMPUTER SAVE	**What's in the Toy Box?** (Program Beebots using directional language) PROGRAMME DIRECTION POSITION SEQUENCE	**Our Local Area**	**Women in History** (Word processing in Word – type diary entry from English) KEYBOARD ENTER RETURN SPACE	**Kenya:** **Too Hot to Handle!** (To design an African scene on Scratch) BACKDROP SPRITE
National Online Safety Lessons	**Self-image & Identity** **Online Relationships** FRIEND SAFE ME INTERNET	**Online Reputation** ONLINE KIND	**Online Bullying** STOP BULLY	**Managing Online Information** **Health, Wellbeing & Lifestyle** INFORMATION SLEEP TIME EXERCISE	**Privacy & Security** SECURE PASSWORD	**Copyright & Ownership** OWN COPY
Y2	**Our Great Britain** (Create a PowerPoint) SLIDE TEXT	**British Bridges** (Use an appropriate programme to create a picture of a bridge) TOOLS FORMAT	**Greenland: Below Zero!**	**UK Climate** (Use Turtle Logo to create a garden outline and programme a gardener) FORWARD RIGHT ALGORITHM	**World Explorers**	**Commotion in the Ocean**

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National Online Safety Lessons	**Self-image & Identity** AVATAR IMAGE IDENTITY	**Online Relationships** FRIEND SAFE ME INTERNET	**Online Reputation Online Bullying** ONLINE KIND STOP BULLY	**Managing Online Information** INFORMATION WEBSITES SEARCH ENGINES AUTO COMPLETE	**Health, Wellbeing & Lifestyle** SLEEP TIME EXERCISE	**Copyright & Ownership Privacy & Security** OWN COPY SECURE PASSWORD
Y3	**Prehistoric Britain**	**Master of Disaster** (Word Processing in Publisher– Volcano explanation text with pictures) TYPING FONT DOCUMENT	**Dinosaurs and Fossils**	**Food and Farming** (Internet research - where foods come from) INFORMATION GATHER INQUIRE	**Egyptians** (Use Scratch to help a mummy escape from a tomb) ALGORITHM MOTION PROJECT	**Plymouth Hoe: Our City!**
National Online Safety Lessons	**Self-image & Identity Online Relationships** AVATAR IMAGE IDENTITY SOCIAL MEDIA COMMUNICATE MESSAGING	**Online Reputation** TRUSTWORTHY VALIDITY OPINION	**Online Bullying Managing Online Information** REPORT BLOCK CYBER-BULLYING WEBSITES SEARCH ENGINES AUTO COMPLETE	**Health, Wellbeing & Lifestyle** LIFESTYLE TECHNOLOGY DEVICE	**Privacy & Security** STRANGER SECURITY	**Copyright & Ownership** PERSONAL
Y4	**Shang Dynasty** (Create a storyboard in Word/Publisher relating to the Shang Dynasty) APPLICATION EDITOR PHOTOGRAPH	**Journey Through North America**	**Ancient Greece** (Internet research – based on Ancient Greece) INFORMATION GATHER INQUIRE	**Australia**	**Ancient Rome** (Create a Roman themed animation using Stop Motion Animator on Chromebook) ANIMATION FRAME SEQUENCE	**Inventions Which Changed the World**
National Online Safety Lessons	**Self-image & Identity** AVATAR IMAGE IDENTITY	**Online Relationships Online Reputation** SOCIAL MEDIA COMMUNICATE MESSAGING TRUSTWORTHY VALIDITY OPINION	**Online Bullying** REPORT BLOCK CYBER-BULLYING	**Managing Online Information Health, Wellbeing & Lifestyle** WEBSITES SEARCH ENGINES AUTO COMPLETE LIFESTYLE TECHNOLOGY DEVICE	**Privacy & Security** STRANGER SECURITY	**Copyright & Ownership** PERSONAL

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Y5	**Romans in Britain/Anglo-Saxons**	**Space:** **Out of this World** (Create a website, using Google Sites based on Space) WEBSITE DESIGN BUILD	**Vikings**	**Our Changing World** (Plan and create an environmentally-themed radio interview – record on Chromebook) AUDACITY SCRIPT, RECORD	**Ancient Maya** (Create a 3-D model of Mayan temple using TinkerCad) TEMPLATE DESIGN TOGGLE	**Amazon Rainforest**
National Online Safety Lessons	**Self-image & Identity** **Online Relationships** AVATAR IMAGE IDENTITY SOCIAL MEDIA COMMUNICATE MESSAGING	**Online Reputation** TRUSTWORTHY VALIDITY OPINION	**Online Bullying** **Managing Online** **Information** REPORT BLOCK CYBER BULLYING WEBSITES SEARCH ENGINE AUTO COMPLETE	**Health, Wellbeing &** **Lifestyle** LIFESTYLE TECHNOLOGY DEVICE	**Privacy & Security** DANGER LINKED DEVICE CONTENT SHARING	**Copyright & Ownership** PLAGERISM CONTENT AUTHOR
Y6	**Dartmoor** (Use Kodu to design a virtual tour of the Dartmoor environment) ENVIRONMENT DESIGN CODING	**Tudors:** **Port of Plymouth** (Create a presentation using Google slides) TRANSLATION PRESENTATION TRANSFORM	**British Empire & Industrial Revolution** (Create a spreadsheet using Excel to record cotton mill and workhouse information) SPREADSHEETS CELLS FORMULA	**Biomes of the world**	**20th Century Conflict** (Create a documentary with interview based on the life of a refugee, include video editing and cutting) VIDEO EDITING CUTTING SCRIPT	
National Online Safety Lessons	**Self-image & Identity** **Online Relationships** AVATAR IMAGE IDENTITY SOCIAL MEDIA COMMUNICATE MESSAGING	**Online Reputation** TRUSTWORTHY VALIDITY OPINION	**Online Bullying** REPORT BLOCK CYBER BULLYING	**Managing Online** **Information** **Health, Wellbeing &** **Lifestyle** WEBSITES SEARCH ENGINE AUTO COMPLETE LIFESTYLE TECHNOLOGY DEVICE	**Privacy & Security** DANGER LINKED DEVICE CONTENT SHARING	**Copyright & Ownership** PLAGERISM CONTENT AUTHOR

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DISCOVERY

Computing Curriculum Progression

The three main strands in the National Curriculum for computing are Computer Science, Information Technology and Digital Literacy, these are carefully mapped out in our computing progression map below. **Online safety (using technology safely)** is explicitly taught each term, and underpins all of the computing lessons.
If a child is achieving the skill that is highlighted, it suggests they are working above the expected level for their age.

KS1	Create and Debug Simple Programs (Understanding Algorithms)	Sequencing, Selection and Repetition in Programming	Using Logical Reasoning to Predict Simple Programs	Understanding Computer Networks	Using Search Technology	Recognising and Use Technology Purposefully
EYFS						
Year 1	**Bee-Bots** • Crate an algorithm by making step by step instructions. • Write and follow detailed sets of instructions. • Use a bee- bot. • Program a bee-bot using arrows one instruction at a time • <mark>Be able to say what an algorithm is</mark> • <mark>Debug their work (checking their instructions for mistakes)</mark> • <mark>Evaluate and improve their sequence</mark> **Scratch** • Open app and start a new scratch project • Add new characters and a background. • Use blocks for movements and directions. • Create a sort set of instructions. • <mark>Change the size of character/hide and show characters</mark>. • <mark>Program two or more characters at the same time.</mark>		**Bee-Bots** • Starting to predict the outcome of simple (2/3 step) commands using Bee-Bots • Start predicting the outcome of slightly more complex commands and begin to identify mistakes.			**Paint** • Discuss how colours are selected and changed. • Explain how to change brush thickness. • Explain how to use the mouse and shape tools to make shapes by dragging the mouse. • Explain how to save paintings. • Understand and explain how to fill colour. • <mark>Locate Undo and redo and explain the function.</mark> • <mark>Know how to create a text box and input text.</mark> • <mark>Explain what the purpose of the formatting tools are and how resizing text.</mark> **Word Processing** • Knowing how to type using two hands. • Knowing and using the shift, space, enter key, <mark>backspace and shift key.</mark> • Know where to locate and use undo and redo • Know how to make text bold, italic or underline and make further changes to the font e.g. style. • Explain how to save work

	• Edit colours and features of characters.					• Develop knowledge of symbols on the keyboard • Select single words
Year 2	**Preparing for Turtle - Logo** • Be able to create algorithms so that a character walks forward a number of steps • Be able to programme a character to follow an algorithm to make accurate turn accurately using quarter turn. • Be able to programme a character to walk squares and rectangles • Creating and follow instructions • Write an algorithm for a shape or route Debug errors in an algorithm (check computerised instructions for mistakes)					**Presentation Skills** • Be able to insert slides, add and type in a text box on a presentation. • Explain how to create folders. • Be able to print files. • Explain how to add images using the image icon. • Be able to format text boxes. • Explain and show how to save files in an ordered file structure. • To be able to search for files on a computer. **Computer Art** • Access an appropriate program for achieving a specific task; • Switch between program tools to produce different techniques; • Alter the formatting of a tool to adjust the colour or size. • Recreate a piece of art using a computer program; manipulate shapes and objects to recreate an art style. Select appropriate tools.
KS2	**Design, Write and Debug Programs**	**Sequencing, Selection and Repetition in Programming**	**Using Logical Reasoning**	**Understanding Computer Networks**	**Using Search Technology**	**Using a Variety of Software**
Year 3	**Scratch** • Write a program which accomplishes a goal and has a character • Create a program that includes a logical sequence • Debug a program they have written (find an issue and improve it) • Use repetition and selection • Work with variables • Understand and use duplicate function • Design their own program • Analyse software to check its fit for purpose				**Internet Research and Communication** • Demonstrate how to bookmark or favourite a page. • Children will be able to demonstrate emotional literacy when communicating online. • Demonstrate how to behave safely online and show good conduct. • They will be able to share a webpage with others. • Identify which word order gives the better results when searching online and be able to support this with examples.	**Word Processing** • Know where to find and use undo and redo • Know where to find the icon and make text bold, italic or underline • To be able to select text in different ways. • To know how to change case. • To know the different ways how to cut, copy and paste text • Insert images • Be able to use the icons to format images • Know how to use an effective layout.

		Animation			Internet Research and Communication	Word Processing/Storyboard
	Build on their own knowledge by innovating a previous design				• They will be able to share a webpage with others. • Children will be able to research the different types of online communication used by their peers • Explain why particular results are returned by a search engine. • They will be able to explain who can access their online communication when they use different forums. Children will know how and why online activity leaves a digital footprint.	• To be able to use the snipping tool. • Use bullet points and numbering effectively and know where the icons are to do this.
Year 4		**Animation** • Explain what is meant by animation • Create a series of linked frames that can be played as a short animation • Control and adjust a time slider to locate a different point in a film • Describe one or more traditional methods of animation • Edit and refine images used in an animation Use a camera or webcam to create their own images which are then used in the animation Photo stories • Add and manipulate images and text in publisher • Add sequence images, text and video in video editing software • Layer images and text • Add effects to improve images in a desktop publisher app • Use advanced cropping techniques • Create consistent presentation effects to achieve a particular style • Use a consistent design when using video editing software • Create the look and feel of a movie using still images, including beginning and ending sequences.			**Internet Research and Communication** • Demonstrate how to bookmark or favourite a page. • Children will be able to demonstrate emotional literacy when communicating online. • Demonstrate how to behave safely online and show good conduct. • They will be able to share a webpage with others. • Identify which word order gives the better results when searching online and be able to support this with examples. • They will be able to share a webpage with others. • Children will be able to research the different types of online communication used by their peers • Explain why particular results are returned by a search engine. • They will be able to explain who can access their online communication when they use different forums. • Children will know how and why online activity leaves a digital footprint.	**Word Processing/Storyboard** • Select edit and manipulate text in different ways • Insert an image into a document • Format an image • Use formatting tools to improve the layout • Use spell check • Insert a simple table • Change the size of the page • Suggest ways that they could improve their layout • Apply effects to an image • Add or delete rows in a table • Create a hyperlink • Format borders of a cell within a table • Apply their knowledge if tools and techniques to improve the layout of a document • Change the background colour of a page

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Year 5			**3D Modelling**	**Internet Research and Website Design**		**Radio Station**
			• Draw 2D shapes or lines • Draw simple 3D models • Manipulate 2D shapes to 3D shapes • Import 3D models • Use a range of sketch up skills e.g. shape, push, pull, orbit, pan, zoom, erase and fill. • Manipulate 3D shapes independently • Select the correct tools for different features	• Comment on the features and layout of a webpage • Create a new webpage with a chosen layout and add text. • Independently search for images that can be used as part of the webpage. • Insert and format an image • Independently create a hyperlink for the website • Learn how to share a webpage so everyone can view it • Use the advanced features of google search		• Record and play their own sounds in recording software • Import an existing sound file into recording software to play. • Choose appropriate software or sounds recording. • Plan and record an advert • Listen to a improve their own recordings by re-recording. • Evaluate what makes a good piece of audio for a radio station • Combine two or more tracks/pieces of audio.
Year 6		**Kodu Programming**				**Spreadsheets**
		• Open Kodu and navigate the programming environment using a keyboard or mouse • Add objects to a world and program them using when and do instructions • Plan and design the features of an original virtual environment • Program a character to move around a track • Create a path for a character to follow • Use tools to change the environment • Create a game with a race track with an end goal for a game • View existing code and explain how it works Edit and refine race track to improve playability			• Enter text and numbers into a spreadsheet • Identify and refer to cells by row and column • Begin to enter formulae with the SUM function • Be able to enter formulae into cells • Edit data and discuss the effect on results • Create graphs • Design their own spreadsheet for a specific purpose Understand the advantages of spreadsheets over manual methods **Film Making** • Plan and write a script using appropriate software (iPad camera/movie maker) • Search for relevant information using appropriate websites • Use a digital video camera or similar to record

						- Plan suitable questions to ask an interviewee - Import video files into video editing software - Plan additional elements for film making such as props **Speak clearly into the camera when being recorded** **Arrange video files to complete the film** **Structure the timing of sections to meet a given running time** **Cross check information from different websites to check for reliability** **Use a variety of camera angles and shots** **Presentation Skills** - Be able to insert slides, add and type in a text box on a presentation. - Explain how to create folders. - Be able to print files. - Explain how to add images using the image icon. - Be able to format text boxes. - Explain and show how to save files in an ordered file structure. - To be able to search for files on a computer. - To create hyperlinks - Edit as required to maintain the design and an effective layout - Insert audio and video files (where possible)