COMPUTING

VISION

We believe computing is a crucial part of children's learning. We aim to equip the children with 'computational thinking' skills to enable them to participate effectively in the digital world.

The national curriculum outlines the three strands of computing that children should be taught: computer science, information technology and digital literacy. Within computer science, children at St. Andrew's learn the main vocabulary, including programming, algorithm and coding. In each year group, they practically explore writing code and creating programs, as well as using logical reasoning to explain how algorithms work. Information technology is the strand that focuses on understanding the internet, using search technologies efficiently and collect, evaluate and present data and information. Finally, within digital literacy, we aim to provide children with the tools to stay safe online. In a world where any information is accessible at all times, and any information can be posted and shared by anybody. We strongly believe that it is important to equip children with the knowledge and tools to be able to discern between reliable and unreliable information and facts. Our aim is to ensure that all our children are able to consistently make safe choices online.

How do we plan and teach computing?

Children learn how computers and computer systems work, as well as design and build programs, develop their ideas using technology and create a range of content. Computing is a practical subject and we are well resourced with Ipads and laptops that are used throughout the school. As well as stand-alone computing lessons and focus days, children are constantly accessing computing equipment throughout the school week to research information, to complete tasks and to present their work in a digital form. Teachers plan a different unit of work for each half term and coverage of all three strands of the computing curriculum is ensured. Some aspects of digital literacy, with a focus on e-safety, are covered in PSHE lessons too.

How do we evaluate learning in computing?

The impact of our computing curriculum can clearly be seen in projects that children create as well as presentations created as digital content. Children have the opportunity to self-assess the content they have created, as well as peer-assess. In each year group, children use past learned skills and apply them to new software and coding programs that they are exploring.

Year 1: Computing Curriculum Map

Unit	Learning About Computers	Digital Art	Programming 1	Data Collection	Creative Media	Programming 2
Overview	**Technology Around Us** • Children understand that technology can help them in their lives. • Understanding keyboard and mouse skills • How to use technology responsibly	**Digital Art Drawing** paintz.app • Children use tools for digital painting • Children gain inspiration form a range of artists' work • Learners consider their preferences when painitng with and without the use of digital devices	**We are Programmers** **BEEBOTS** • Early programming concepts. • What each command for the floor robot does, and use that knowledge to start predicting the outcome of programs. • Early stages of program design through the introduction of algorithms	**Grouping Data** • Labelling, grouping, and searching are important aspects of data and information. • Search data, it must have labels. • Assigning data (images) with different labels in order to demonstrate how computers are able to group and present data.	**We are digital writers-** **Google Docs** • Create and manipulate text. • Use a keyboard and mouse to enter and remove text. • Change the look of their text, and will be able to justify their reasoning in making these changes. • Explain which method paper/computer they prefer and explain their reasoning.	**We are programmers-** **SCRATCH JR** • Investigating sprites and backgrounds. • Use programming blocks to use, modify, and create programs. • Introduction of algorithms. There are two Year 1 programming units: ***Programming A*** – Moving a robot ***Programming B*** – Programming animations
National Curriculum	• Recognise common uses of IT beyond school	• Use technology purposefully to create, organise, store, manipulate and retrieve digital content.	• 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.	• Use technology purposefully to create, organise, store, manipulate and retrieve digital content.	• 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 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.					

Year 2: Computing Curriculum Map

Unit	Learning About Computers	Digital Art	Programming 1	Data Collection	Creative Media	Programming 2
Overview	**IT around us** • What information technology (IT) is with examples • Where they have seen IT in school and beyond • How IT improves our world • Children will learn about the importance of using IT responsibly.	**Digital photography**- WINDOWS PHOTO • Different devices can be used to capture photographs • Capturing, editing, and improving photos. • Images they see may not be real.	**We are programmers- BEEBOTS** • Learners will use given commands in different orders to investigate how the order affects the outcome. • They will also learn about design in programming. • They will develop artwork and test it for use in a program. • They will create and debug algorithms	**We are data collectors – pictograms** https://www.j2e.com/j2data • What the term data means • Use tally charts. • Children will learn the term 'attribute' and use this to help them organise data. • Presenting data visually using software and answer questions.	**We are music makers** https://musiclab.chromeexperiments.com/Experiments • Using a computer to create music. • Listen to a variety of pieces of music and consider how music can make them think and feel. • Compare creating music digitally and non-digitally. • look at patterns and purposefully create music.	**We are Programmers of Quizzes-SCRATCH JR** https://codejr.org/scratchjr/index.html • Sequences of commands have an outcome, and make predictions based on their learning. • Modify designs to create their own quiz questions in ScratchJr • Learners evaluate their work and make improvements to their programming projects.
National Curriculum	• Recognise common uses of IT beyond school	• Use technology purposefully to create, organise, store, manipulate and retrieve digital content.	• 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.	• Use technology purposefully to create, organise, store, manipulate and retrieve digital content.	• 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 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.					

Year 3: Computing Curriculum Map

Unit	Learning About Computers	Digital Art	Programming 1	Data Collection	Creative Media	Programming 2
Overview	**Connecting Computers** • Inputs, processes, and outputs. • Compare digital and non-digital devices. • devices that make up a network's infrastructure, e.g. wireless. • Benefits of connecting devices in a network.	**Digital art – stop frame animation** Stop Motion Studio or Eat My Art app • Create a stop-frame animation • Create a story-based animation. • Adding media to their animation, such as music and text.	**Programming – Sequencing Sound** SCRATCH https://scratch.mit.edu/ • Sequencing in programming through Scratch. • Introduced to a selection of motion, sound, and event blocks which they will use to create their own programs, • The final project is to make a representation of a piano.	**Data and Information – Branching Database** https://www.j2e.com/j2data • What a branching database is and how to create one. • They will use yes/no questions to sort groups of objects. Learners will create physical and on-screen branching databases. • Real-world applications for branching databases.	**Creating Media – Desktop publishing** https://www.canva.com/ • Use desktop publishing software and consider choices of font size, colour and type to edit • Words-templates',‘orientation', and ‘placeholders' • Add text and images to create their own pieces • Look at a range of page layouts to evaluate why publishing is used in the real world.	**Programming – Events in action in programs** SCRATCH https://scratch.mit.edu/ • Links between events and actions • Moving a sprite in four directions (up, down, left, and right). • Moving in a maze, • Use of Pen blocks. • Change the size and colour of lines. • Coding their own maze-tracing program.
National Curriculum	• 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.	• Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.	• 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 simple algorithms work and to detect and correct errors in algorithms and programs.	• 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.	• Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.	• 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 simple algorithms work and to detect and correct errors in algorithms and programs.
	Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.					

Year 4: Computing Curriculum Map

Unit	Learning About Computers	Digital Art	Programming 1	Data Collection	Creative Media	Programming 2
Overview	**Computing systems and networks – the internet** • Internet as a network of networks which need to be kept secure. • World Wide Web in order to learn about who owns content and what they can access, add, and create. • Evaluate online content to decide how honest, accurate, • Understand the consequences of false information.	**Digital art – audio production** https://wavacity.com/ • Input device (microphone) and output devices (speaker or headphones) • Ownership of digital audio and the copyright • Produce a podcast, which will include editing their work, adding multiple tracks, and opening and saving the audio files. • Evaluate their work	**Programming – repetition in shapes** https://www.calormen.com/jslogo/ • Learners will create programs by planning, modifying, and testing commands to create shapes and patterns. • They will use Logo, a text-based programming language. • looks at repetition and loops within programming	**Data and information – data logging** https://store.data-harvest.co.uk/easysense2 • Why data is collected over time? • How computers can use special input devices called sensors to monitor the environment. • Access data captured over long periods of time. and review and analyse data. • Use data loggers to automatically collect the data needed to answer questions.	**Creating media – photo editing** paintz.app • How digital images can be changed and edited • How they can then be resaved and reused. • Impact that editing images can have, • Evaluate the effectiveness of their choices.	**Programming – repetition in games** SCRATCH https://scratch.mit.edu/ • Repetition in programming difference between count-controlled and infinite loops, and use their knowledge to modify existing animations and games using repetition. • design and create a game which uses repetition
National Curriculum	Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.	• Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.	Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.	• Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.	• Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.	• Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.
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Year 5: Computing Curriculum Map

Unit	Learning About Computers	Digital Art	Programming 1	Data Collection	Creative Media	Programming 2
Overview	**Computing systems – systems and searching** • Information is transferred between systems and devices. • Small-scale systems as well as large-scale systems. • Explain the input, output, and process aspects of a variety of different real-world systems. • How information is found on the World Wide Web • Learning how search engines work-how they select and rank results.	**Creating media – video production** https://www.canva.com/ for video editing CAMERAS • create short video • skills of capturing, editing • assess their progress	**Physical Computing CRUMBLE** https://projects.raspberrypi.org/en/projects/getting-started-crumble Software redfernelectronics.co.uk/crumble-software. • Physical computing to explore programming through Crumble • Microcontroller (Crumble controller) and learn how to connect and program it to control components (including output devices — LEDs and motors). • Knowledge of repetition (through the 'if...then...' structure) • Will design and make a working model of a fairground carousel that will demonstrate their understanding of how the microcontroller and its components are connected.	**Data and information – flat file database** https://www.j2e.com/j2data • Flat-file database can be used to organise data in records. • Use tools within a database to order and answer questions about data. • Create graphs and charts from their data to help solve problems. • Use a real-life database to answer a question, and present their work to others.	**Creating media – vector graphics** https://docs.google.com/drawings • Create vector drawings. • Use different drawing tools to help them create images. • Images in vector drawings are created using shapes and lines, and each individual element in the drawing is called an object. • Layer their objects and begin grouping and duplicating them to support the creation of more complex pieces of work.	**Programming – making quizzes** SCRATCH https://scratch.mit.edu/ • Revisiting how 'conditions' can be used in programming • How the 'if… then… else...' structure can be used to select different outcomes depending on whether a condition is 'true' or 'false'. • They represent this understanding in algorithms, and then by constructing programs in scratch • How to write programs that ask questions and use selection to control the outcomes based on the answers given. • Design a quiz in response to a given task
National Curriculum	Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.	• Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.	• Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.	Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.	• Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.	• Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.
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Year 6: Computing Curriculum Map

Unit	Learning About Computers	Digital Art	Programming 1	Data Collection	Creative Media	Programming 2
Overview	**Computing systems – communication and collaboration** • How data is transferred over the internet. • Makeup and structure of data packets. • Learners then look at how the internet facilitates online communication and collaboration • They complete shared projects online. • Evaluate different methods of communication. • What should and should not be shared on the internet.	**Creating media – web page creation** GOOGLE SITES https://sites.google.com/new • creating websites for a chosen purpose. • Design and evaluate their own website using Google Sites. • Pay specific attention to copyright and fair use of media, the aesthetics of the site, and navigation paths.	**Programming – variables in games** SCRATCH https://scratch.mit.edu/ • Variables in programming through games in Scratch. • What variables are and relate them to real-world examples of values that can be set and changed. • Then they use variables to create a simulation of a scoreboard. • In Lesson 4, learners focus on design.	**Data and information – spreadsheets** Google sheets • Organising data into columns and rows to create their own data set. • Formatting data to support calculations • Use formulas to produce calculated data. • Apply formulas multiple cells by duplicating them. • Create charts, and evaluate their results in comparison to questions asked.	**Creating media – 3D modelling** https://www.tinkercad.com/ • Produce 3D models. • Working in a 3D space, moving, resizing, and duplicating objects. • Create hollow objects using placeholders and combine multiple objects to create a model of a desk tidy. • Examine the benefits of grouping and ungrouping 3D objects, • Create their own 3D model of a building.	**Programming – sensing movement** https://makecode.microbit.org/ • Summises KS2 programming unit and brings together elements of all the four programming constructs: sequence from Year 3, repetition from Year 4, selection from Year 5, and variables. • Utilising a physical device — the micro:bit.
National Curriculum	Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.	Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.	Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.	Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.	Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.	Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; ifentify a range of ways to report concerns about content and contact.
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