Computing at St Mary's:

Intent

In the ever changing and developing technological world in which we live, it is imperative that children receive a high-quality computing education. Children need to be digitally literate; able to express their ideas and manage themselves in a digital world.

In a world where technology changes rapidly – where programs/software become obsolete in a matter of years – equipping children with computing skills (programming, debugging, systematic problem solving) that transcend the technology is vital.

Implementation

Our Computing curriculum is implemented through our long-term plan, which indicates the areas (Connect – developing an understanding of how to safely connect with others, Code – developing an understanding of instructions, logic and sequences, Communicate – using applications to communicate one's ideas; and Collect – developing an understanding of data, databases and their uses) of the curriculum that are taught in each year group across the year.

The Connect, Code and Communicate units are explicitly taught, one per term in Years 1-6. The Collect unit is taught in a cross-curricular manner, with classes engaging in data and databases in their Mathematics and Science learning.

Online Safety is an element of the Computing curriculum that is taught every half term and is one that is also taught in a cross curricular manner across the school. Every time any computing equipment is used, in any subject, the teacher poses questions regarding how to stay safe online. As a school we also participate in Safer Internet Day.

Key learning in the units Connect and Communicate may also be covered in a cross-curricular manner. In many different subjects across the school, computing equipment is used to amplify and extend learning. For example, children may: conduct some research using search engines in History, create pieces using software in Music, write letters using word processors in Literacy, create instructional videos in Science. We feel it is important that children do not associate computing equipment within the school only with the subject of Computing.

Impact

Children at St Mary's are confident users of hardware and software and are able to safely navigate the online world. Children enjoy Computing lessons and using the computing equipment within their broad and balanced curriculum. The quality of children's understanding is evident through the quality work on Google Classroom and their Computing folders. When speaking to children at St Mary's they will be able to tell you how to stay safe online.

We have subject specialist staff who are passionate in teaching computing and instil independence and growth mind-set into our children. Teachers are able to build upon previous years learning and address knowledge gaps in their future planning. We have good links with the Computing department at the feeder secondary school, so we ensure that every child leaves St Mary's with the crucial skills required to benefit them in secondary school and beyond.

Threshold concepts

Connect This concept involves developing an understanding of how to safely connect with others.	**Code** This concept involves developing an understanding of instructions, logic and sequences.
Communicate This concept involves using apps to communicate one's ideas.	**Collect** This concept involves developing an understanding of databases and their uses.

NB: 'Connect' – Online Safety is taught throughout the year, in PSHE lessons and whenever Computing equipment is used.

NB: 'Collect' – databases (inputting data, graphing etc.) taught in Maths/Science/Other lessons throughout the year.

Computing curriculum map

NB: NCCE resources available here - https://teachcomputing.org/resources

	Autumn	Spring	Summer
Y1	**NCCE - Computing systems & networks – Technology around us** Learners will become more familiar with the different components of a computer by developing their keyboard and mouse skills, and also start to consider how to use technology responsibly.	**NCCE - Creating media – Digital painting** Learners will explore the world of digital art and its exciting range of creative tools. They will be empowered to create their own paintings, while getting inspiration from a range of other artists. They will consider their preferences when painting with, and without, the use of digital devices.	**NCCE – Programming A – Moving a robot** Learners will explore using individual commands, both with other learners and as part of a computer program. They will identify what each floor robot command does and use that knowledge to start predicting the outcome of programs. **[completed in different ½ term to Y2's Code unit]**
Y2	**NCCE - Creating media – Making music** Learners will explore how music can make them think and feel. They will make patterns and use those patterns to make music with both percussion instruments and digital tools. They will also create different rhythms and tunes, using the movement of animals for inspiration.	**NCCE - Computing systems & networks – IT around us** With an initial focus on IT in the home, learners explore how IT benefits society in places such as shops, libraries, and hospitals. Whilst discussing the responsible use of technology, and how to make smart choices when using it.	**NCCE – Programming A – Robot algorithms** This unit develops pupils' understanding of instructions in sequences and the use of logical reasoning to predict outcomes. Pupils will use given commands in different orders to investigate how the order affects the outcome. **[completed in different ½ term to Y1's Code unit]**
Y3	**NCCE – Programming A – Sequence in music** This unit explores the concept of sequencing in programming through Scratch. It begins with an introduction to the programming environment, which will be new to most learners.	**NCCE - Computing systems & networks – Connecting computer** Learners will develop their understanding of digital devices, with an initial focus on inputs, processes, and outputs. Learners will compare digital and non-digital devices, before being introduced to computer networks that include network infrastructure devices like routers and switches.	**NCCE - Creating media – Desktop publishing** During this unit, learners will become familiar with the terms 'text' and 'images' and understand that they can be used to communicate messages. They will use desktop publishing software and consider careful choices of font size,

			colour and type to edit and improve premade documents.
Y4	**NCCE - Creating media – Audio editing** In this unit, learners will initially examine devices capable of recording digital audio, which will include identifying the input device (microphone) and output devices (speaker or headphones).	**NCCE – Programming A – Repetition in shapes** This unit looks at repetition and loops within programming. Pupils will create programs by planning, modifying, and testing commands to create shapes and patterns.	**NCCE - Computing systems & networks – The Internet** During this unit learners will apply their knowledge and understanding of networks, to appreciate the internet as a network of networks which need to be kept secure.
Y5	**NCCE - Computing systems & networks – Sharing information** In this unit, learners will develop their understanding of computer systems and how information is transferred between systems and devices. Learners will consider small-scale systems as well as large-scale systems.	**NCCE - Creating media – Vector drawing** In this unit learners will find out that vector images are made up of shapes. They will learn how to use the different drawing tools and how images are created in layers.	**NCCE – Programming B – Selection in quizzes** In this unit, pupils develop their knowledge of selection by revisiting how conditions can be used in programs and then learning how the If… Then… Else structure can be used to select different outcomes depending on whether a condition is true or false.
Y6	**NCCE – Programming A – Variables in games** This unit explores the concept of variables in programming through games in Scratch.	**NCCE - Computing systems & networks – Communication** In this unit, the class will learn about the World Wide Web as a communication tool.	**NCCE - Creating media – Web page creation** This unit introduces learners to the creation of websites for a chosen purpose. Learners identify what makes a good web page and use this information to design and evaluate their own website using Google Sites.

NB: In all NCCE 'Creating media' units, there is an alternative set of lessons for each year group. Teachers may choose the alternative set, if they wish.

Progression (Computing curriculum)

	Communicate This concept involves using apps to communicate one's ideas. **NB – See 'Learning graphs' for more detail.**	**Connect** This concept involves developing an understanding of how to safely connect with others. **NB – See 'Learning graphs' for more detail.**	**Code** This concept involves developing an understanding of instructions, logic and sequences.	**Collect** This concept involves developing an understanding of databases and their uses.
Year 1	Learners will build their knowledge of parts of a computer and develop the basic skills needed to effectively use a computer keyboard and mouse.	Learners should already be familiar with: . How to switch their device on . Usernames . Passwords	This unit progresses students' knowledge and understanding of giving and following instructions. It moves from giving instructions to each other to giving instructions to a robot by programming it.	Learners will begin to input data into tables within spreadsheets.
Year 2	Learners will build on their knowledge of using technology safely and responsibly, and begin to consider the implications of the choices that they make.	This unit progresses students' knowledge through listening to music and considering how music can affect how we think and feel. Learners will then purposefully create rhythm patterns and music.	Pupils should have had some experience of creating short programs and predicting the outcome of a simple program. This unit progresses students' knowledge and understanding of algorithms and how they are implemented as programs on digital devices.	
Year 3	Learners gain knowledge and understanding of technology by focussing on digital and non-digital devices, and introducing the concept of computers connected together as a network.	This unit progresses learners' knowledge and understanding of using digital devices to combine text and images building on work from Digital Painting (Y1).	This unit assumes that learners will have some prior experience of programming; the KS1 NCCE units cover floor robots.	Learners will input data into tables within spreadsheets and begin to make different graphs to represent this data.
Year 4	Progresses learners' knowledge and understanding of networks in Year 3. In Year 5, they will continue to develop their knowledge and	This unit progresses students' knowledge and understanding of creating media, by focusing on the	This unit progresses students' knowledge and understanding of programming. It progresses from the sequence of commands in a	

	understanding of computing systems and online collaborative working.	recording and editing of sound to produce a podcast.	program to using count-controlled loops. Pupils will create algorithms and then implement those algorithms as code.	
Year 5	Progresses learners' knowledge and understanding of computing systems and online collaborative working.	This unit progresses students' knowledge and understanding of digital painting and has some links to desktop publishing in which learners used digital images. They are now creating the images that they could use in desktop publishing documents.	This unit assumes that learners will have prior experience of programming using block-based construction (eg Scratch), understand the concepts of 'sequence' and 'repetition'.	Learners will input more complex data into tables within spreadsheets, making different graphs to suit different types of data and presenting this information in interesting ways.
Year 6	Progresses learners' knowledge and understanding of computing systems and online collaborative working.	Progresses students' knowledge and understanding of the following: digital painting, desktop publishing and vector drawing.	This unit assumes that pupils will have some prior experience of programming in Scratch. Specifically, they should be familiar with the programming constructs of sequence, repetition, and selection.	

Assessment

Formative assessment

Every lesson includes formative assessment opportunities for teachers to use. These opportunities are listed in lesson plans and are included to ensure that misconceptions are recognised and addressed if they occur. They vary from teacher observation or questioning, to marked activities. These assessments are vital to ensure that teachers are adapting their teaching to suit the needs of the pupils that they are working with. The learning objective and success criteria are introduced at the beginning of every lesson. At the end of every lesson, pupils are invited to assess how well they feel they have met the learning objective using thumbs up, thumbs sideways, or thumbs down. This gives pupils a reminder of the content that has been covered, as well as a chance to reflect. It is also a chance for teachers to see how confident the class is feeling so that they can make changes to subsequent lessons accordingly.

Summative assessment (KS1)

When we assess, we want to ensure that we are assessing a pupil's understanding of computing concepts and skills, as opposed to their reading and writing skills. Therefore, we encourage observational assessment while pupils are still developing their literacy skills. We believe that this is the most reliable way to capture an accurate picture of learning. To capture summative assessment data of KS1 pupils, teachers will use the success criteria in each lesson and capturing some of the following while the lesson is taking place: The work that pupils complete (marking), notes on conversations or discussions that teachers have or hear during an activity, photographs of the work that pupils produce during an activity, pupils' self-assessments at the end of the lesson.

Summative assessment (KS2)

Every unit includes an optional summative assessment framework in the form of either a multiple-choice quiz (MCQ) or a rubric. All units are designed to cover both skills and concepts from across the computing national curriculum. Units that focus more on conceptual development include an MCQ. Units that focus more on skills development end with a project and include a rubric. Each of the MCQ questions has been carefully chosen to represent learning that should have been achieved within the unit. Each MCQ includes an answer sheet that highlights the misconceptions that pupils may have if they have chosen a wrong answer. This ensures that teachers know which areas to return to in later units. Rubrics are a tool to help teachers assess project-based work. Each rubric covers the application of skills that have been directly taught across the unit, and highlights to teachers whether the pupil is approaching (emerging), achieving (expected), or exceeding the expectations for their age group.

KS2 assessment map

	Autumn	Spring	Summer
Year 3	**Programming A – Sequence in music** Rubric	**Computing systems & networks – Connecting computer** Multiple-choice quiz	**Creating media – Desktop publishing** Rubric
Year 4	**Creating media – Audio editing** Rubric	**Programming A – Repetition in shapes** Multiple-choice quiz	**Computing systems & networks – The Internet** Rubric
Year 5	**Computing systems & networks – Sharing information** Multiple-choice quiz	**Creating media – Vector drawing** Rubric	**Programming B – Selection in quizzes** Multiple-choice quiz
Year 6	**Programming A – Variables in games** Rubric	**Computing systems & networks – Communication** Multiple-choice quiz	**Creating media – Web page creation** Rubric

Online safety map

NB: Project evolve resources available here: https://projectevolve.co.uk/toolkit/resources/years/

	Autumn **Self-image and identity, Online relationships and (KS2) Privacy and security** 			**Spring** **Online reputation, and Online bullying** 		**Summer** **Managing online information, Health, well-being and lifestyle and (KS2) Copyright and ownership** 		
	Self-image and identity	**Online relationships**	**Privacy and security**	**Online reputation**	**Online bullying**	**Managing online information**	**Health, well-being and lifestyle**	**Copyright and ownership**
Year R	I can recognise, online or offline, that anyone can say 'no' to somebody who makes them feel uncomfortable or upset.	I can recognise some ways in which the internet can be used to communicate.	No unit in EYFS/KS1	I can identify ways that I can put information on the internet.	I can describe ways that some people can be unkind online.	I can talk about how to use the internet as a way of finding information online.	I can identify rules that help keep us safe and healthy in and beyond the home when using technology.	No unit in EYFS/KS1
Year 1	If something happens that makes me feel sad, worried, uncomfortable or frightened I can give examples of	I can explain why it is important to be considerate and kind to people online		I can describe what information I should not put online without asking a trusted adult first.	I can describe how to behave online in ways that do not upset others and can give examples.	I can give simple examples of how to find information using digital technologies, e.g. search	I can explain rules to keep myself safe when using technology both in and beyond the home.	

	when and how to speak to an adult I can trust and how they can help.	and to respect their choices.				engines, voice activated searching.		
Year 2	I can give examples of issues online that might make someone feel sad, worried, uncomfortable or frightened; I can give examples of how they might get help.	I can give examples of how someone might use technology to communicate with others they don't also know offline and explain why this might be risky.		I can explain how information put online about someone can last for a long time.	I can explain what bullying is, how people may bully others and how bullying can make someone feel.	I can explain why some information I find online may not be real or true.	I can explain simple guidance for using technology in different environments and settings e.g. accessing online technologies in public places and the home environment.	
Year 3	I can explain how people can represent themselves in different ways online	I can explain what it means to 'know someone' online and why this might be different from knowing someone offline.	I can describe simple strategies for creating and keeping passwords private.	I can give examples of what anyone may or may not be willing to share about themselves online. I can explain the need to be careful before sharing anything personal.	I can describe appropriate ways to behave towards other people online and why this is important.	I can demonstrate how to use key phrases in search engines to gather accurate information online.	I can explain why spending too much time using technology can sometimes have a negative impact on anyone.	I can explain why copying someone else's work from the internet without permission isn't fair and can explain what problems this might cause.

Year 4	I can explain how my online identity can be different to my offline identity.	I can give examples of how to be respectful to others online and describe how to recognise healthy and unhealthy online behaviours.	I can describe strategies for keeping personal information private, depending on context.	I can explain ways that some of the information about anyone online could have been created, copied or shared by others.	I can describe ways people can be bullied through a range of media (e.g. image, video, text, chat).	I can describe some of the methods used to encourage people to buy things online (e.g. advertising offers; in-app purchases, pop-ups) and can recognise some of these when they appear online.	I can identify times or situations when someone may need to limit the amount of time they use technology e.g. I can suggest strategies to help with limiting this time.	I can give some simple examples of content which I must not use without permission from the owner, e.g. videos, music, images.
Year 5	I can demonstrate how to make responsible choices about having an online identity, depending on context.	I can explain that there are some people I communicate with online who may want to do me or my friends harm. I can recognise that this is not my / our fault.	I can explain how many free apps or services may read and share private information (e.g. geolocation) with others.	I can describe ways that information about anyone online can be used by others to make judgments about an individual and why these may be incorrect.	I can recognise online bullying can be different to bullying in the physical world and can describe some of those differences.	I can explain what is meant by 'being sceptical'; I can give examples of when and why it is important to be 'sceptical'.	I can explain how and why some apps and games may request or take payment for additional content and explain the importance of seeking permission from a trusted adult before purchasing.	I can give examples of content that is permitted to be reused and know how this content can be found online.
Year 6	I can identify and critically evaluate online content relating to	I can explain that taking or sharing inappropriate	I can describe simple ways to increase	I can explain the ways in which anyone can develop a	I can describe how to capture bullying	I can define the terms 'influence', 'manipulation'	I can assess and action different strategies to limit the impact of	I can demonstrate how to make references to

	gender, race, religion, disability, culture and other groups, and explain why it is important to challenge and reject inappropriate representations online.	images of someone (e.g. embarrassing images), even if they say it is okay, may have an impact for the sharer and others; and who can help if someone is worried about this.	privacy on apps and services that provide privacy settings.	positive online reputation.	content as evidence (e.g screen-grab, URL, profile) to share with others who can help me.	and 'persuasion' and explain how someone might encounter these online (e.g. advertising and 'ad targeting' and targeting for fake news).	technology on health (e.g. night-shift mode, regular breaks, correct posture, sleep, diet and exercise).	and acknowledge sources I have used from the internet.

NB: In all units, for all year groups, there are alternative lessons available. Teachers may choose to teach an alternative lesson if they feel it is better suited to their class.

Computing vocabulary linked to 400-word project

Milestone 1 Year 1 and 2	Code, compute, error, input, media, reverse, virtual, motion, control, variable, save, select, algorithm
Milestone 2 Year 3 and 4	Coordinates, trigger, specify, condition, proximity, variables, value, functions, define, contribute, moderated, copyright, application, device, debugging, programming, consent, output, manipulation, filters, publishing
Milestone 3 Year 5 and 6	Command, communicate, cipher, decompose, tinker, consent, computational thinking, abstraction, input, output, search engines, vectors, phishing, HTML

Subject specific vocabulary is taught using the follow strategy:

- Define it
- Capture the essence
- Apply it

Subject specific vocabulary will be visible on classroom displays and used by pupils in discussions and written work.

Breadth of Study:

Note: Items marked * are not statutory.

Key Stage 1	Key Stage 2
• Understand what algorithms are, how they are implemented as programs on digital devices, and that programs execute by following a sequence of instructions. • Write and test simple programs. • Use logical reasoning to predict the behaviour of simple programs. • Organise, store, manipulate and retrieve data in a range of digital formats. • Communicate safely and respectfully online, keeping personal information private and recognise common uses of information technology beyond school.	• Design and write programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts. • Use sequence, selections and repetition in programs; work with variables and various forms of input and output; generate appropriate inputs and predicted outputs to test programs. • Use logical reasoning to explain how a simple algorithm works, 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. • Describe how internet search engines find and store data; use search engines effectively; be discerning in evaluating digital content; respect individuals and intellectual property; use technology responsibly, securely and safely. • Select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information.

Cultural capital in computing:

	Autumn	Spring	Summer
Whole school events	Parents online safety evening	Safer internet day	
Reception			
Year 1			
Year 2			
Year 3			
Year 4			
Year 5			
Year 6			

Cross curricular in Computing:

	Autumn	Spring	Summer
Whole school events	Parents online safety evening		
Reception			
Year 1			
Year 2			
Year 3			
Year 4			
Year 5			
Year 6			