St. Andrew's
Church of England Primary School
ENRICHING LIVES

Computing
Curriculum Journey

1. What is Computing?

At St. Andrew's, we believe that Computing at is the understanding of information and computation, how digital systems work, and how to put this knowledge to use through programming and systems.

2. Through the eyes of our children, Computing is important because:

'It helps us to express ourselves and develop our ideas through, information and communication technology so that when we become adults, we can use our computing skills to successfully live, learn and work.'

3. Curriculum Intent

At St. Andrew's Church of England Primary School, we aim to provide our children with the skills and creativity to understand and change the world. Our children make links with Mathematics, Science and Design and Technology to support them in understanding computer systems. We aim for our children to be digitally literate on a range of digital systems so they can be active participants for their future workplace and as active participants in the digital world.

The national curriculum for computing aims to ensure that all pupils:

- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- are responsible, competent, confident and creative users of information and communication technology.

4. Implementation

The teaching and implementation of the Computing curriculum at St. Andrew's C.E. Primary School is based on the Early Learning Goals and National Curriculum; it is supported by expectations from National Centre for Computing Education's, ensuring a well-structured approach.

The units for key stages 1 and 2 are based on a spiral curriculum. This means that each of the themes is revisited regularly (at least once in each year group), and pupils revisit each theme through a new unit that consolidates and builds on prior learning within that theme. This style of curriculum design reduces the amount of knowledge lost through forgetting, as topics are revisited yearly. It also ensures that connections are made even if different teachers are teaching the units within a theme in consecutive years.

Our Curriculum uses the National Centre for Computing Education's computing taxonomy to ensure comprehensive coverage of the subject. This has been developed through a thorough review of the KS1–4 computing programme of study, and the GCSE and A level computer science specifications across all awarding bodies. All learning outcomes can be described through a high-level taxonomy of ten strands, ordered alphabetically as follows:

Algorithms — Be able to comprehend, design, create, and evaluate algorithms

Computer networks — Understand how networks can be used to retrieve and share information, and how they come with associated risks

Computer systems — Understand what a computer is, and how its constituent parts function together as a whole Creating media — Select and create a range of media including text, images, sounds, and video

Data and information — Understand how data is stored, organised, and used to represent real-world artefacts and scenarios

Design and development — Understand the activities involved in planning, creating, and evaluating computing artefacts

Effective use of tools — Use software tools to support computing work

Impact of technology — Understand how individuals, systems, and society as a whole interact with computer systems

Programming — Create software to allow computers to solve problems

Safety and security — Understand risks when using technology, and how to protect individuals and systems

The taxonomy provides categories and an organised view of content to encapsulate the discipline of computing. Whilst all strands are present at all phases, they are not always taught explicitly.

5. Impact

By the end of each key stage, pupils are expected to know, apply and understand the content, skills and processes specified in the relevant programme of study. At St. Andrew's, at the end of each Computing unit of work, we use summative assessment (based on the objectives in the 2014 National Curriculum and outcomes from National Centre for Computing Education's to determine children's understanding and inform future planning.

6. Programmes of Study

6.1 Programmes of Study - Primary

EYFS	KS1	KS2
Nursery: Children will have access to toys such as remote control cars, simple toy tills, Interactive White Board and so on, as well as learning about online safety. **Reception:** Children will use a range of technology as part of their learning provision as well as learning about online safety. For example, a PC and iPad with age appropriate programmes such as the 2Simple software. Interactive Whiteboards will also be used as a teaching tool.	• 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	• 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

6.2 Programmes of Study - Next Steps

KS3
• Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems • Understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem • Use 2 or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions • Understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal] • Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems • Understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits • Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users • Create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability • Understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct, and know how to report concerns

7. Progression

- through each strand

7.1 Progression in EYFS

	Development Matters & ELG
Nursery	CL - Use a wider range of vocabulary PSED - Increasingly follow rules, understanding why they are important. PSED - Do not always need an adult to remind them of a rule. PD - Make healthy choices about activity UW - Explore how things work.
Reception	CL - Learn new vocabulary PSED - Explain the reasons for rules, know right from wrong and try to behave accordingly. PD – Know and talk about the different factors that support their overall health and wellbeing: sensible amounts of 'screen time' EAD - Explore, use and refine a variety of artistic effects to express their ideas and feelings. EAD - Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.

7.2 Progression in KS1 & KS2 - Computing systems and networks

Y1/2 Computing systems and networks – Technology around us	• identify technology • identify a computer and its main parts • use a mouse in different ways • use a keyboard to type on a computer • use the keyboard to edit text • create rules for using technology responsibly
Y1/2 Computing systems and networks – IT around us	• recognise the uses and features of information technology • identify the uses of information technology in the school • identify information technology beyond school • explain how information technology helps us • explain how to use information technology safely • recognise that choices are made when using information technology
Y3/4 Computing systems and networks – Connecting computers	• explain how digital devices function • identify input and output devices • recognise how digital devices can change the way we work • explain how a computer network can be used to share information • explore how digital devices can be connected • recognise the physical components of a network
Y3/4 Computing systems and networks – The Internet	• describe how networks physically connect to other networks • recognise how networked devices make up the internet • outline how websites can be shared via the World Wide Web (WWW) • describe how content can be added and accessed on the World Wide Web (WWW) • recognise how the content of the WWW is created by people • evaluate the consequences of unreliable content
Y5/6 Computing systems and networks - Systems and searching	• create questions with yes/no answers • identify the attributes needed to collect data about an object • create a branching database • explain why it is helpful for a database to be well structured • plan the structure of a branching database • independently create an identification tool
Y5/6Computing systems and networks - Communication and collaboration	• explain that data gathered over time can be used to answer questions • use a digital device to collect data automatically • explain that a data logger collects 'data points' from sensors over time • recognise how a computer can help us analyse data • identify the data needed to answer questions • use data from sensors to answer questions

7.3 Progression in KS1 & KS2 – Creating Media

Y1/2 Creating media – Digital painting	• describe what different freehand tools do • use the shape tool and the line tools • make careful choices when painting a digital picture • explain why I chose the tools I used • use a computer on my own to paint a picture • compare painting a picture on a computer and on paper
Y1/2 Creating media – Digital photography	• use a digital device to take a photograph • make choices when taking a photograph • describe what makes a good photograph • decide how photographs can be improved • use tools to change an image • recognise that photos can be changed
Y3/4 Creating media - Stop-frame animation	• explain that animation is a sequence of drawings or photographs • relate animated movement with a sequence of images • plan an animation • identify the need to work consistently and carefully • review and improve an animation • evaluate the impact of adding other media to an animation
Y3/4 Creating media - Audio production	• identify that sound can be recorded • explain that audio recordings can be edited • recognise the different parts of creating a podcast project • apply audio editing skills independently • combine audio to enhance my podcast project • evaluate the effective use of audio
Y5/6 Creating media - Video production	• explain what makes a video effective • identify digital devices that can record video • capture video using a range of techniques • create a storyboard • identify that video can be improved through reshooting and editing • consider the impact of the choices made when making and sharing a video
Y5/6 Creating media – Web page creation	• review an existing website and consider its structure • plan the features of a web page • consider the ownership and use of images (copyright) • recognise the need to preview pages • outline the need for a navigation path • recognise the implications of linking to content owned by other people

7.4 Progression in KS1 & KS2 – Programming A

Y1/2 Programming A – Moving a robot	• explain what a given command will do • act out a given word • combine forwards and backwards commands to make a sequence • combine four direction commands to make sequences • plan a simple program • find more than one solution to a problem
Y1/2 Programming A – Robot algorithms	• describe a series of instructions as a sequence • explain what happens when we change the order of instructions • use logical reasoning to predict the outcome of a program • explain that programming projects can have code and artwork • design an algorithm • create and debug a program that I have written
Y3/4 Programming A - Sequencing sounds	• explore a new programming environment • identify that commands have an outcome • explain that a program has a start • recognise that a sequence of commands can have an order • change the appearance of my project • create a project from a task description
Y3/4 Programming A – Repetition in shapes	• identify that accuracy in programming is important • create a program in a text-based language • explain what 'repeat' means • modify a count-controlled loop to produce a given outcome • decompose a task into small steps • create a program that uses count-controlled loops to produce a given outcome
Y5/6 Programming A – Selection in physical computing	• control a simple circuit connected to a computer • write a program that includes count-controlled loops • explain that a loop can stop when a condition is met • explain that a loop can be used to repeatedly check whether a condition has been met • design a physical project that includes selection • create a program that controls a physical computing project
Y5/6 Programming A – Variables in games	• define a 'variable' as something that is changeable • explain why a variable is used in a program • choose how to improve a game by using variables • design a project that builds on a given example • use my design to create a project • evaluate my project

7.5 Progression in KS1 & KS2 – Data Information

Y1/2 Data and information – Grouping data	• label objects • identify that objects can be counted • describe objects in different ways • count objects with the same properties • compare groups of objects • answer questions about groups of objects
Y1/2 Data and information – Pictograms	• recognise that we can count and compare objects using tally charts • recognise that objects can be represented as pictures • create a pictogram • select objects by attribute and make comparisons • recognise that people can be described by attributes • explain that we can present information on a computer
Y3/4 Data and information – Branching databases	• create questions with yes/no answers • identify the attributes needed to collect data about an object • create a branching database • explain why it is helpful for a database to be well structured • plan the structure of a branching database • independently create an identification tool
Y3/4 Data and information – Data logging	• explain that data gathered over time can be used to answer questions • use a digital device to collect data automatically • explain that a data logger collects 'data points' from sensors over time • recognise how a computer can help us analyse data • identify the data needed to answer questions • use data from sensors to answer questions
Y5/6 Data and information – Flat-file databases	• use a form to record information • compare paper and computer-based databases • outline how you can answer questions by grouping and then sorting data • explain that tools can be used to select specific data • explain that computer programs can be used to compare data visually • use a real-world database to answer questions
Y5/6 Data and information – Spreadsheets	• create a data set in a spreadsheet • build a data set in a spreadsheet • explain that formulas can be used to produce calculated data • apply formulas to data • create a spreadsheet to plan an event • choose suitable ways to present data

7.6 Progression in KS1 & KS2 – Creating Media

Y1/2 Creating media – Digital writing	• use a computer to write • add and remove text on a computer • identify that the look of text can be changed on a computer • make careful choices when changing text • explain why I used the tools that I chose • compare typing on a computer to writing on paper
Y1/2 Creating media - Digital music	• say how music can make us feel • identify that there are patterns in music • experiment with sound using a computer • use a computer to create a musical pattern • create music for a purpose • review and refine our computer work
Y3/4 Creating media – Desktop publishing	• recognise how text and images convey information • recognise that text and layout can be edited • choose appropriate page settings • add content to a desktop publishing publication • consider how different layouts can suit different purposes • consider the benefits of desktop publishing
Y3/4 Creating media – Photo editing	• explain that the composition of digital images can be changed • explain that colours can be changed in digital images • explain how cloning can be used in photo editing • explain that images can be combined • combine images for a purpose • evaluate how changes can improve an image
Y5/6 Creating media – Introduction to vector graphics	• identify that drawing tools can be used to produce different outcomes • create a vector drawing by combining shapes • use tools to achieve a desired effect • recognise that vector drawings consist of layers • group objects to make them easier to work with • apply what I have learned about vector drawings
Y5/6 Creating media – 3D Modelling	• recognise that you can work in three dimensions on a computer • identify that digital 3D objects can be modified • recognise that objects can be combined in a 3D model • create a 3D model for a given purpose • plan my own 3D model • create my own digital 3D model

7.7 Progression in KS1 & KS2 – Programming B

Y1/2 Programming B - Programming animations	• choose a command for a given purpose • show that a series of commands can be joined together • identify the effect of changing a value • explain that each sprite has its own instructions • design the parts of a project • use my algorithm to create a program
Y1/2 Programming B - Programming quizzes	• explain that a sequence of commands has a start • explain that a sequence of commands has an outcome • create a program using a given design • change a given design • create a program using my own design • decide how my project can be improved
Y3/4 Programming B - Events and actions in programs	• explain how a sprite moves in an existing project • create a program to move a sprite in four directions • adapt a program to a new context • develop my program by adding features • identify and fix bugs in a program • design and create a maze-based challenge
Y3/4 Programming B – Repetition in games	• develop the use of count-controlled loops in a different programming environment • explain that in programming there are infinite loops and count controlled loops • develop a design that includes two or more loops which run at the same time • modify an infinite loop in a given program • design a project that includes repetition • create a project that includes repetition
Y5/6 Programming B – Selection in quizzes	• explain how selection is used in computer programs • relate that a conditional statement connects a condition to an outcome • explain how selection directs the flow of a program • design a program which uses selection • create a program which uses selection • evaluate my program
Y5/6 Programming B - Sensing movement	• create a program to run on a controllable device • explain that selection can control the flow of a program • update a variable with a user input • use a conditional statement to compare a variable to a value • design a project that uses inputs and outputs on a controllable device • develop a program to use inputs and outputs on a controllable device

8. Online Safety

8.1 Online Safety

Online safety is an important part of our computing curriculum. We use the materials developed by Project Evolve. This doesn't use activities where young people are told what or what not to do. It provides the right opportunity for discussion; prompted by appropriate questions accompanied by honest and useful information to shape thinking and challenge misconceptions.

Each term we identify a specific focus and deliver a range of age appropriate activities to develop the necessary understanding and appreciation in online safety. This spiral curriculum is so designed that it builds on previous learning to develop both a broader and deeper understanding though the year and from year to year.

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8.2. Online Safety in Early Years to 7yrs

Self Image & Identity	• recognise, online or offline, that anyone can say 'no' - 'please stop' - 'I'll tell' - 'I'll ask' to somebody who makes them feel sad, uncomfortable, embarrassed or upset. • recognise that there may be people online who could make someone feel sad, embarrassed or upset. • If something happens that makes me feel sad, worried, uncomfortable or frightened I can give examples of when and how to speak to an adult I can trust and how they can help. • explain how other people may look and act differently online and offline. • 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.
Online Relationships	• recognise some ways in which the internet can be used to communicate. • give examples of how I (might) use technology to communicate with people I know • give examples of when I should ask permission to do something online and explain why this is important. • use the internet with adult support to communicate with people I know (e.g. video call apps or services). • explain why it is important to be considerate and kind to people online and to respect their choices. • explain why things one person finds funny or sad online may not always be seen in the same way by others. • 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. (e.g. email, online gaming, a pen-pal in another school / country). • explain who I should ask before sharing things about myself or others online. • describe different ways to ask for, give, or deny my permission online and can identify who can help me if I am not sure. • explain why I have a right to say 'no' or 'I will have to ask someone'. I can explain who can help me if I feel under pressure to agree to something I am unsure about or don't want to do. • identify who can help me if something happens online without my consent. • explain how it may make others feel if I do not ask their permission or ignore their answers before sharing something about them online. • explain why I should always ask a trusted adult before clicking 'yes', 'agree' or 'accept' online
Online Reputation	• identify ways that I can put information on the internet. • recognise that information can stay online and could be copied. • describe what information I should not put online without asking a trusted adult first. • explain how information put online about someone can last for a long time. • describe how anyone's online information could be seen by others. • who to talk to if something has been put online without consent or if it is incorrect.
Online Bullying	• describe ways that some people can be unkind online. • offer examples of how this can make others feel • describe how to behave online in ways that do not upset others and can give examples. • explain what bullying is, how people may bully others and how bullying can make someone feel. • explain why anyone who experiences bullying is not to blame • talk about how anyone experiencing bullying can get help. •

Managing Online Information	• talk about how to use the internet as a way of finding information online. • identify devices I could use to access information on the internet. • give simple examples of how to find information using digital technologies, e.g. search engines, voice activated searching. • I know / understand that we can encounter a range of things online including things we like and don't like as well as things which are real or make believe / a joke. • I know how to get help from a trusted adult if we see content that makes us feel sad, uncomfortable, worried or frightened. • use simple keywords in search engines • demonstrate how to navigate a simple webpage to get to information I need (e.g. home, forward, back buttons; links, tabs and sections). • explain what voice activated searching is and how it might be used, and know it is not a real person (e.g. Alexa, Google Now, Siri). • explain the difference between things that are imaginary, 'made up' or 'make believe' and things that are 'true' or 'real' • explain why some information I find online may not be real or true.
Privacy and Security	• identify some simple examples of my personal information (e.g. name, address, birthday, age, location). • describe who would be trustworthy to share this information with; explain why they are trusted. • explain how passwords are used to protect information, accounts and devices. • recognise more detailed examples of information that is personal to someone (e.g where someone lives and goes to school, family names). • explain why it is important to always ask a trusted adult before sharing any personal information online, belonging to myself or others. • explain how passwords can be used to protect information, accounts and devices. • explain and give examples of what is meant by 'private' and 'keeping things private'. • describe and explain some rules for keeping personal information private (e.g. creating and protecting passwords). • explain how some people may have devices in their homes connected to the internet and give examples (e.g. lights, fridges, toys, televisions).
Copyright and Ownership	• I know that work I create belongs to me. • name my work so that others know it belongs to me. • explain why work I create using technology belongs to me • say why it belongs to me (e.g. 'I designed it' or 'I filmed it''). • save my work under a suitable title or name so that others know it belongs to me (e.g. filename, name on content). • I understand that work created by others does not belong to me even if I save a copy • recognise that content on the internet may belong to other people. • describe why other people's work belongs to them
Health Wellbeing and Lifestyle	• identify rules that help keep us safe and healthy in and beyond the home when using technology • give some simple examples of these rules • explain rules to keep myself safe when using technology both in and beyond the home. • explain simple guidance for using technology in different environments and settings e.g. accessing online technologies in public places and the home environment. • say how those rules / guides can help anyone accessing online technologies

8.3. Online Safety in 7yrs to 11 years

Self-Image and Identity	• explain what is meant by the term 'identity'. • explain how people can represent themselves in different ways online • explain ways in which someone might change their identity depending on what they are doing online (e.g. gaming; using an avatar; social media) and why. • explain how my online identity can be different to my offline identity. • describe positive ways for someone to interact with others online and understand how this will positively impact on how others perceive them. • explain that others online can pretend to be someone else, including my friends, and can suggest reasons why they might do this. • explain how identity online can be copied, modified or altered. • demonstrate how to make responsible choices about having an online identity, depending on context. • identify and critically evaluate online content relating to gender, race, religion, disability, culture and other groups, and explain why it is important to challenge and reject inappropriate representations online. • describe issues online that could make anyone feel sad, worried, uncomfortable or frightened. I know and can give examples of how to get help, both on and offline. • explain the importance of asking until I get the help needed.
Online Relationship	• describe ways people who have similar likes and interests can get together online. • explain what it means to 'know someone' online and why this might be different from knowing someone offline. • explain what is meant by 'trusting someone online', why this is different from 'liking someone online', and why it is important to be careful about who to trust online including what information and content they are trusted with. • explain why someone may change their mind about trusting anyone with something if they feel nervous, uncomfortable or worried. • explain how someone's feelings can be hurt by what is said or written online. • explain the importance of giving and gaining permission before sharing things online; how the principles of sharing online is the same as sharing offline e.g. sharing images and videos. • describe strategies for safe and fun experiences in a range of online social environments (e.g. livestreaming, gaming platforms) • give examples of how to be respectful to others online and describe how to recognise healthy and unhealthy online behaviours. • explain how content shared online may feel unimportant to one person but may be important to other people's thoughts feelings and beliefs. • give examples of technology-specific forms of communication (e.g. emojis, memes and GIFs). • explain that there are some people I communicate with online who may want to do me or my friends harm. recognise that this is not my / our fault. • describe some of the ways people may be involved in online communities and describe how they might collaborate constructively with others and make positive contributions. (e.g. gaming communities or social media groups). • explain how someone can get help if they are having problems and identify when to tell a trusted adult. • demonstrate how to support others (including those who are having difficulties) online. • explain how sharing something online may have an impact either positively or negatively • describe how to be kind and show respect for others online including the

	importance of respecting boundaries regarding what is shared about them online and how to support them if others do not. • describe how things shared privately online can have unintended consequences for others. e.g. screen-grabs. • explain that taking or sharing inappropriate 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.
Online Reputation	• explain how to search for information about others online • describe how to find out information about others by searching online. • explain ways that some of the information about anyone online could have been created, copied or shared by others. • search for information about an individual online and summarise the information found. • describe ways that information about anyone online can be used by others to make judgments about an individual and why these may be incorrect • explain strategies anyone can use to protect their 'digital personality' and online reputation, including degrees of anonymity.
Online Bullying	• describe appropriate ways to behave towards other people online and why this is important. • give examples of how bullying behaviour could appear online and how someone can get support. • recognise when someone is upset, hurt or angry online. • describe ways people can be bullied through a range of media (e.g. image, video, text, chat). • explain why people need to think carefully about how content they post might affect others, their feelings and how it may affect how others feel about them (their reputation). • recognise online bullying can be different to bullying in the physical world and can describe some of those differences. • describe how what one person perceives as playful joking and teasing (including 'banter') might be experienced by others as bullying. • explain how anyone can get help if they are being bullied online and identify when to tell a trusted adult. • identify a range of ways to report concerns and access support both in school and at home about online bullying. • explain how to block abusive users. • describe the helpline services which can help people experiencing bullying, and how to access them (e.g. Childline or The Mix). • describe how to capture bullying content as evidence (e.g screen-grab, URL, profile) to share with others who can help me. • explain how someone would report online bullying in different contexts.
Privacy and Security	• describe simple strategies for creating and keeping passwords private. • give reasons why someone should only share information with people they choose to and can trust. explain that if they are not sure or feel pressured then they should tell a trusted adult. • describe how connected devices can collect and share anyone's information with others. • describe strategies for keeping personal information private, depending on context. • explain that internet use is never fully private and is monitored, e.g. adult supervision.

	• describe how some online services may seek consent to store information about me; I know how to respond appropriately and who ask if I am not sure. • I know what the digital age of consent is and the impact this has on online services asking for consent. • explain what a strong password is and demonstrate how to create one. • explain how many free apps or services may read and share private information (e.g. friends, contacts, likes, images, videos, voice, messages, geolocation) with others. • explain what app permissions are and can give some examples. • describe effective ways people can manage passwords (e.g. storing them securely or saving them in the browser). • explain what to do if a password is shared, lost or stolen. • describe how and why people should keep their software and apps up to date, e.g. auto updates. • describe simple ways to increase privacy on apps and services that provide privacy settings. • describe ways in which some online content targets people to gain money or information illegally; describe strategies to help me identify such content (e.g. scams, phishing). • I know that online services have terms and conditions that govern their use.
Copyright and Ownership	• explain why copying someone else's work from the internet without permission isn't fair and can explain what problems this might cause. • When searching on the internet for content to use, explain why I need to consider who owns it and whether I have the right to reuse it. • give some simple examples of content which I must not use without permission from the owner, e.g. videos, music, images. • assess and justify when it is acceptable to use the work of others • give examples of content that is permitted to be reused and know how this content can be found online. • demonstrate the use of search tools to find and access online content which can be reused by others • demonstrate how to make references to and acknowledge sources I have used from the internet.
Managing Online Information	• demonstrate how to use key phrases in search engines to gather accurate information online. • explain what autocomplete is and how to choose the best suggestion. • explain how the internet can be used to sell and buy things • explain the difference between a 'belief', an 'opinion' and a 'fact. and can give examples of how and where they might be shared online, e.g. in videos, memes, posts, news stories etc. • explain that not all opinions shared may be accepted as true or fair by others (e.g. monsters under the bed). • describe and demonstrate how we can get help from a trusted adult if we see content that makes us feel sad, uncomfortable, worried or frightened. • analyse information to make a judgement about probable accuracy and I understand why it is important to make my own decisions regarding content and that my decisions are respected by others. • describe how to search for information within a wide group of technologies and make a judgement about the probable accuracy (e.g. social media, image sites, video sites). • 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. • explain why lots of people sharing the same opinions or beliefs online do not make those opinions or beliefs true. • explain that technology can be designed to act like or impersonate living things (e.g. bots) and describe what the benefits and the risks might be. • explain what is meant by fake news e.g. why some people will create stories or alter photographs and put them online to pretend something is true when it isn't. • explain the benefits and limitations of using different types of search technologies e.g. voice-activation search engine. explain how some technology can limit the information I am presented with. • explain what is meant by 'being sceptical'; give examples of when and why it is important to be 'sceptical'. • evaluate digital content and can explain how to make choices about what is trustworthy e.g. differentiating between adverts and search results. • explain key concepts including: information, reviews, fact, opinion, belief, validity, reliability and evidence. • identify ways the internet can draw us to information for different agendas, e.g. website notifications, pop-ups, targeted ads • describe ways of identifying when online content has been commercially sponsored or boosted, (e.g. by commercial companies or by vloggers, content creators, influencers). • explain what is meant by the term 'stereotype', how 'stereotypes' are amplified and reinforced online, and why accepting 'stereotypes' may influence how people think about others. • describe how fake news may affect someone's emotions and behaviour, and explain why this may be harmful • explain what is meant by a 'hoax'. explain why someone would need to think carefully before they share. • explain how search engines work and how results are selected and ranked. • explain how to use search technologies effectively. • describe how some online information can be opinion and can offer examples. • explain how and why some people may present 'opinions' as 'facts'; why the popularity of an opinion or the personalities of those promoting it does not necessarily make it true, fair or perhaps even legal. • define the terms 'influence', 'manipulation' and 'persuasion' and explain how someone might encounter these online (e.g. advertising and 'ad targeting' and targeting for fake news). • I understand the concept of persuasive design and how it can be used to influences peoples' choices. • demonstrate how to analyse and evaluate the validity of 'facts' and information and explain why using these strategies are important. • explain how companies and news providers target people with online news stories they are more likely to engage with and how to recognise this. • describe the difference between online misinformation and dis-information • explain why information that is on a large number of sites may still be inaccurate or untrue. assess how this might happen (e.g. the sharing of misinformation or disinformation). • identify, flag and report inappropriate content.
Health Wellbeing and Lifestyle	• too much time using technology can sometimes have a negative impact on anyone; give some examples of both positive and negative activities where it is easy to spend a lot of time engaged • explain why some online activities have age restrictions, why it is important to

	follow them and know who talk to if others pressure me to watch or do something online that makes me feel uncomfortable (e.g. age restricted gaming or web sites). • explain how using technology can be a distraction from other things, in both a positive and negative way. • identify times or situations when someone may need to limit the amount of time they use technology e.g. suggest strategies to help with limiting this time. • describe ways technology can affect health and well-being both positively (e.g. mindfulness apps) and negatively. • describe some strategies, tips or advice to promote health and wellbeing with regards to technology. • I recognise the benefits and risks of accessing information about health and well-being online and how we should balance this with talking to trusted adults and professionals. • explain how and why some apps and games may request or take payment for additional content (e.g. in-app purchases, lootboxes) and explain the importance of seeking permission from a trusted adult before purchasing. • describe common systems that regulate age-related content (e.g. PEGI, BBFC, parental warnings) and describe their purpose. • I recognise and can discuss the pressures that technology can place on someone and how / when they could manage this. • recognise features of persuasive design and how they are used to keep users engaged (current and future use). • assess and action different strategies to limit the impact of technology on health (e.g. night-shift mode, regular breaks, correct posture, sleep, diet and exercise).

9. Themes and Coverage

9.1 At St. Andrew's, we are dedicated to the teaching and delivery of a high-quality Computing curriculum through well planned and resourced projects and experiences. We have determined that Computing will taught in bespoke units across the school year as well as being accessed within other curriculum subjects as appropriate.. During Computing units, our children draw upon subject knowledge and skills across the breadth of the curriculum. Through the evaluation of past and present technology they can reflect upon the impact of Computing on everyday life and the wider world.

9.2 Nursery & EYFS Themes

Nursery children will focus on:

- recognising too much screen time isn't healthy,
- staying safe online
- basic interaction with age appropriate learning experiences such as remote control cars, using a mouse and an interactive whiteboard.

Reception children will continue this learning with:

- further online safety and learning
- how to use technology for a purpose such as creating pictures and taking photographs of their own work.

9.3 KS1 – 2 year Summary of Coverage

Cycle A/C – T1	**Technology around us -** Recognising technology in school and using it responsibly.
Cycle A/C – T2	**Digital painting -** Choosing appropriate tools in a program to create art, and making comparisons with working non-digitally.
Cycle A/C – T3	**Moving a robot -** Writing short algorithms and programs for floor robots, and predicting program outcomes.
Cycle A/C – T4	**Grouping data -** Exploring object labels, then using them to sort and group objects by properties.
Cycle A/C – T5	**Digital writing -** Using a computer to create and format text, before comparing to writing non-digitally.
Cycle A/C – T6	**Robot algorithms -** Creating and debugging programs, and using logical reasoning to make predictions.
Cycle B/D – T1	**Information technology around us -** Identifying IT and how its responsible use improves our world in school and beyond.
Cycle B/D – T2	**Digital photography -** Capturing and changing digital photographs for different purposes.
Cycle B/D – T3	**Programming animations -** Designing and programming the movement of a character on screen to tell stories.

Cycle B/D – T4	**Pictograms -** Collecting data in tally charts and using attributes to organise and present data on a computer.
Cycle B/D – T5	**Digital music -** Using a computer as a tool to explore rhythms and melodies, before creating a musical composition.
Cycle B/D – T6	**Programming quizzes -** Designing algorithms and programs that use events to trigger sequences of code to make an interactive quiz.

9.4 Lower KS2 – 2 year Summary of Coverage

Cycle A/C – T1	**Connecting computers -** Identifying that digital devices have inputs, processes, and outputs, and how devices can be connected to make networks.
Cycle A/C – T2	**Stop-frame animation -** Capturing and editing digital still images to produce a stop-frame animation that tells a story.
Cycle A/C – T3	**Sequencing sounds -** Creating sequences in a block-based programming language to make music.
Cycle A/C – T4	**Branching databases -** Building and using branching databases to group objects using yes/no questions.
Cycle A/C – T5	**Desktop publishing -** Creating documents by modifying text, images, and page layouts for a specified purpose.
Cycle A/C – T6	**Events and actions in programs -** Writing algorithms and programs that use a range of events to trigger sequences of actions.
Cycle B/D – T1	**The internet -** Recognising the internet as a network of networks including the WWW, and why we should evaluate online content.
Cycle B/D – T2	**Audio production -** Capturing and editing audio to produce a podcast, ensuring that copyright is considered.
Cycle B/D – T3	**Repetition in shapes -** Using a text-based programming language to explore count-controlled loops when drawing shapes.
Cycle B/D – T4	**Data logging -** Recognising how and why data is collected over time, before using data loggers to carry out an investigation.
Cycle B/D – T5	**Photo editing -** Manipulating digital images, and reflecting on the impact of changes and whether the required purpose is fulfilled.
Cycle B/D – T6	**Repetition in games -** Using a block-based programming language to explore count-controlled and infinite loops when creating a game.

9.5 Upper KS2 - 2 year Summary of Coverage

Cycle A/C – T1	**Systems and searching -** Recognising IT systems in the world and how some can enable searching on the internet.
Cycle A/C – T2	**Video production -** Planning, capturing, and editing video to produce a short film.
Cycle A/C – T3	**Selection in physical computing -** Exploring conditions and selection using a programmable microcontroller.
Cycle A/C – T4	**Flat-file databases -** Using a database to order data and create charts to answer questions.
Cycle A/C – T5	**Introduction to vector graphics -** Creating images in a drawing program by using layers and groups of objects.
Cycle A/C – T6	**Selection in quizzes -** Exploring selection in programming to design and code an interactive quiz.
Cycle B/D – T1	**Communication and collaboration -** Exploring how data is transferred by working collaboratively online.
Cycle B/D – T2	**Webpage creation -** Designing and creating webpages, giving consideration to copyright, aesthetics, and navigation.
Cycle B/D – T3	**Variables in games -** Exploring variables when designing and coding a game.
Cycle B/D – T4	**Introduction to spreadsheets –** Answering questions by using Spreadsheets to organise and calculate data.
Cycle B/D – T5	**3D modelling -** Planning, developing, and evaluating 3D computer models of physical objects.
Cycle B/D – T6	**Sensing movement -** Designing and coding a project that captures inputs from a physical device.

10. Medium Term Plans

10.1. Progression across Cycle A & C

	Nursery	Reception	KS1	Lower KS2	Upper KS2
Term 1	• Using a mouse • Staying safe online • Accessing age appropriate experiences using the computer • Provision to include remote control and electronic toys such as cars and a till.	**Computer skills -** turning on and off, selecting a programme. **Staying safe online –** use Digi-Duck scheme **Digital photography** - using an iPad to photograph work **Finding information online** - searching for information and images including Google Earth	**Technology around us -** Recognising technology in school and using it responsibly.	**Connecting computers -** Identifying that digital devices have inputs, processes, and outputs, and how devices can be connected to make networks.	**Systems and searching -** Recognising IT systems in the world and how some can enable searching on the internet.
Term 2			**Digital painting -** Choosing appropriate tools in a program to create art, and making comparisons with working non-digitally.	**Stop-frame animation -** Capturing and editing digital still images to produce a stop-frame animation that tells a story.	**Video production -** Planning, capturing, and editing video to produce a short film.
Term 3			**Moving a robot -** Writing short algorithms and programs for floor robots, and predicting program outcomes.	**Sequencing sounds -** Creating sequences in a block-based programming language to make music.	**Selection in physical computing -** Exploring conditions and selection using a programmable microcontroller.
Term 4			**Grouping data -** Exploring object labels, then using them to sort and group objects by properties.	**Branching databases -** Building and using branching databases to group objects using yes/no questions.	**Flat-file databases -** Using a database to order data and create charts to answer questions.
Term 5			**Digital writing -** Using a computer to create and format text, before comparing to writing non-digitally.	**Desktop publishing -** Creating documents by modifying text, images, and page layouts for a specified purpose.	**Introduction to vector graphics -** Creating images in a drawing program by using layers and groups of objects.
Term 6			**Robot algorithms -** Creating and debugging programs, and using logical reasoning to make predictions.	**Events and actions in programs -** Writing algorithms and programs that use a range of events to trigger sequences of actions.	**Selection in quizzes -** Exploring selection in programming to design and code an interactive quiz.

10.2 Progression across Cycle B & D

	Nursery	Reception	KS1	Lower KS2	Upper KS2
Term 1			**Information technology around us -** Identifying IT and how its responsible use improves our world in school and beyond.	**The internet -** Recognising the internet as a network of networks including the WWW, and why we should evaluate online content.	**Communication and collaboration -** Exploring how data is transferred by working collaboratively online.
Term 2			**Digital photography -** Capturing and changing digital photographs for different purposes.	**Audio production -** Capturing and editing audio to produce a podcast, ensuring that copyright is considered.	**Webpage creation -** Designing and creating webpages, giving consideration to copyright, aesthetics, and navigation.
Term 3		**Computer skills -** turning on and off, selecting a programme.	**Programming animations -** Designing and programming the movement of a character on screen to tell stories.	**Repetition in shapes -** Using a text-based programming language to explore count-controlled loops when drawing shapes.	**Variables in games -** Exploring variables when designing and coding a game.
Term 4	• Using a mouse • Staying safe online • Accessing age appropriate experiences using the computer	**Staying safe online –** use Digi-Duck scheme	**Pictograms -** Collecting data in tally charts and using attributes to organise and present data on a computer.	**Data logging -** Recognising how and why data is collected over time, before using data loggers to carry out an investigation.	**Introduction to spreadsheets –** Answering questions by using Spreadsheets to organise and calculate data.
Term 5	• Provision to include remote control and electronic toys such as cars and a till.	**Digital photography** - using an iPad to photograph work **Finding information online -** searching for information and images including Google Earth	**Digital music -** Using a computer as a tool to explore rhythms and melodies, before creating a musical composition.	**Photo editing -** Manipulating digital images, and reflecting on the impact of changes and whether the required purpose is fulfilled.	**3D modelling -** Planning, developing, and evaluating 3D computer models of physical objects.
Term 6			**Programming quizzes -** Designing algorithms and programs that use events to trigger sequences of code to make an interactive quiz.	**Events and actions in programs -** Writing algorithms and programs that use a range of events to trigger sequences of actions.	**Sensing movement -** Designing and coding a project that captures inputs from a physical device.

11. Vocabulary

11.1. Progression in Vocabulary

The teaching and use of appropriate vocabulary forms an important part of teaching learning. These age specific 'key word' lists identify the vocabulary that we expect teachers to be using. In addition, specific key words (must words) will be selected from these lists for each unit of work for inclusion in the knowledge organisers.

These lists will continue to be updated and refined on an annual basis.

11.2

	Vocabulary	Definition
EYFS Nursery	safe	To be protected from risk or danger
	pull	A force on an object to cause movement
	button	A small device on a piece of electrical or electronic equipment which is pressed to operate it
	headphones	A pair of earphones joined by a band placed over the head, for listening to audio signals such as music or speech
	computer	A computer is a device for working with information. The information can be numbers, words, pictures, movies, or sounds
	click	A short, sharp sound as of a switch being operated – using a mouse to select using the push
	mouse	A hand held device which helps you to control and select a computer
	turn	To move in a circular direction wholly or partly round an axis or point
	scroll	Move the screen with finger
	tablet	A small portable computer

11.3

EYFS Reception

Vocabulary	Definition
speaker	Produce sound out of a computer
type	Writing on a computer
technology	Machines and equipment which use scientific knowledge
choices	Choosing between two or more possibilities
internet	A global network providing information and communication - YouTube
safety	Protecting yourself from risk or danger
scroll	To move a screen up and down
keyboard	A computer keyboard is an input device that allows a person to enter letters, numbers, and other symbols

11.4

Key Stage 1	Vocabulary	Definition
	website	A set of related web pages
	rules	A guide for conduct or action
	online	Connected to a computer network
	email	A written message sent from one computer to another
	private information	Knowledge or facts that should not be shared
	robots	A machine that can perform some of the same tasks as a human being
	patterns	An arrangement of shapes, lines, letters, numbers, or colours that can be repeated or used again and again
	programme	A sequence of instructions that allows a computer to perform a task or a set of operations
	algorithm	A detailed step-by-step instruction set or formula for solving a problem or completing a task
	space bar	A long horizontal key on the lower edge of a keyboard
	digital	Storing, using, or sending information electronically in the form of numbers.
	purpose	A reason or plan that guides an action; design or goal
	online tools	Programs, websites or online resources that can make tasks easier to complete
	shut down	Turn off a computer
	communicate	To exchange thoughts, ideas, or information
	photographs	A picture made by using a camera that records an image on a surface that is sensitive to light.
	video	A picture part of television
	sound	Anything that people or animals can hear with their ears
	multimedia	The combination of sound, still pictures, and video
	data	Facts, figures, or other pieces of information that can be used to learn about something.
	pictogram	A chart or graph which uses pictures to represent data
	digitally	Storing, using, or sending information electronically

11.5

Key Stage 1	Vocabulary	Definition
	appropriate/ inappropriate	Right for the purpose; proper. Not right or proper for the time or place;
	cyber-bullying	Use of online technology to hurt others
	sites	Short for website
	digital footprint	A trail of data you create while using the Internet
	keyword searching	In terms of search engines, a keyword is any search term entered on Google
	word process	Production of type written documents
	right-angle turn	A right angle is exactly 90°
	coding	Instructions a computer needs in order to function
	sequence	An ordered list
	debug	An important part of programming is testing your program and 'debugging' (which means removing the bugs/problems)
	frames	Rectangular areas meant for inserting graphics and text
	select tool	A cursor
	drawing tool	Changeable tools to use on the computer to allow digital drawing
	Search tool	Programs, websites or online resources that can make tasks easier to complete. For example, Google
	stop motion	Stop motion animation is a filming technique in which objects (such as clay models) are photographed in a series of slightly different positions so that
	templates	A pattern used as a guide for cutting or drawing
	animation	A way of making a movie from many still images
	documents	A file made by a computer containing information in the form of text or media.
	present	Demonstrate and display work/ideas
	enter/return	A key on a keyboard which submits information or leaves a line
	caps lock	A computer key that causes all letters typed to be in uppercase until disabled
	backspace	To delete whilst typing or move backwards
	hyperlinks	Text or an image on any web page that, when clicked on, causes another web page or another point on the same page to be displayed on the

11.6

Lower Key Stage 2

Vocabulary	Definition
E-safety rules	Being safe on the internet. Some people also include the safe use of technology in this as well
log on	Establish communication and initiate interaction with a computer or system
personal information	Any factual or subjective information, whether recorded **or** not, about an identifiable individual
private	Personal and not to be shared
attach	To join, fasten, or connect. You can attach a document to an email as a way of sharing
open	To begin to use a document or software
save	The process of storing data **to** a flash drive, or hard drive
mechanical systems	A system with moving parts
coordinates	A group of numbers used to indicate the position of a point or line
variables	In programming, a variable is a placeholder for a value, a box that you can store information in
broadcast	Used in Scratch, a message that is sent through the Scratch program, activating receiving scripts
import	Bring a file from a different program into the one you're using
sequence debugging	The process of detecting and the removing of existing and potential errors within instructions
test + improve	A trial to find out what something is, what it is made up of, or how good it is – then use the findings to change it for the better
sequence programming	A sequence is an ordered list containing successive steps or functions for performing certain actions. It can be used in programming or as a simple
alignment	Arranging, adjusting into a straight line, logical system or coordinated system.
copy	Making a duplicate of a file, image or words
paste	Insert data from the clipboard into an application
collaborate	To work with someone else or another piece of software
questioning	A sentence that asks for a reply
database	A large collection of information in a computer. In a database, information is arranged so that it can be quickly changed or searched through.
recording data	Writing and saving information from an activity or piece of software
data logger	An electronic device that records data over time

11.7

Lower Key stage 2

Vocabulary	Definition
search engine	A computer program that searches documents, especially on the World Wide Web, for a specified word or words and provides a list of documents
reporting	To notify the administrator of a website or application about a problem
secure	Techniques for ensuring that data stored in a computer cannot be read or compromised by any individuals without authorisation
copyright	A copyright is a protection for any published work that helps to prevent that work from being used without prior authorisation
validate	To prove acceptable
digital content	Any content that exists in the form of digital data. Also known as digital media
Scratch	A computer program. Allows children to create games on the PC via a simple visual programming language
logical reasoning	A system of forming conclusions based on a set of premises or information
command	A directive/instruction to a computer program acting as an
3D game	Interactive computer entertainment that is graphically presented in the three dimensions of
debug algorithms	The process of detecting and the removing of existing and potential errors within instructions
lasso tool	A freehand selection
download	Transferring data from one location to another
upload	To upload a file is to send it to another computer that is set up to receive it
resize	Alter the size of (something, especially a computer window or image)
enhance	Increase the value, attractiveness, or quality of
layering	The organisation of programming into separate functional components that interact in some sequential and hierarchical way
decomposing	Breaking a complex problem or system into parts that are easier to conceive/understand
input	To provide or give something to the computer
output	The data or information produced by operation of a computer program or subroutine for transfer to another program or to an external device
Critically evaluate	Thinking analytically about something
URL	The address of a web page

11.8

Upper Key Stage 2	Vocabulary	Definition
	input device	An input device is a piece of computer hardware equipment used to provide data and control signals
	output device	Is any piece of computer hardware equipment which converts information into humanreadable form
	digital device	A piece of physical equipment that uses digital data.
	software	Any set of instructions that tells the hardware what to do
	hardware	Any part of your computer that has a physical structure
	profile	The information a user shares on social media presenting some personal details to other users
	motherboard	The motherboard is your computer's main circuit board
	hard drive	The hard drive is what stores all your data.
	RAM	Random Access Memory. It's the computer's short term memory
	ROM	Read Only Memory. It is memory containing hardwired instructions that the computer uses when it boots up.
	CPU	The microprocessor, (also called the Central Processing Unit), is the brain of the computer.
	GPU	Graphics Processing Unit used for computing graphics
	operating system	Software that communicates with the hardware and allows other programs to run.
	design	A plan or drawing produced to show the look and function or workings of a building, garment, or other object before it is made
	navigate	The act of opening and moving through computer menus
	3D model	The process of developing a mathematical representation of any three-dimensional surface of an object
	responsibility	The condition or fact of being responsible – to have a duty
	editing tools	The ability to change text by adding, deleting and rearranging letters, words, sentences and paragraphs
	refinement	Improving

11.9

Upper Key Stage 2	Vocabulary	Definition
	acronyms	An abbreviation of a sentence using the first letter of each word. Online users may use acronyms as a quick way to convey thoughts, actions or sentiments e.g. LOL
	AR (augmented reality)	A technology which superimposes a computer-generated image over a user's real view of the world, thus providing a composite view
	connectivity	The capacity for 'connected' devices to share data about individuals or groups on-line. Individuals may or may not be aware that this is data is being collected and
	generate	To produce
	variable	In programming, a variable is a placeholder for a value, a box that you can store information in.
	operators	Object that is capable of manipulating a value
	list	A list in Scratch (called an array in other programming languages) is a tool that can be used to store multiple pieces of information at once.
	arithmetic operators	A mathematical function that takes two quantities and performs a calculation on them
	loops	A loop describes the process of a software program or script repeats the same instructions or processes the same information over and over until receiving the
	manipulating	To handle or operate skilfully
	digital art	Artistic work or practice that uses digital technology
	editing	To correct, cut, add to, or change with the goal of producing a finished product
	digital music	The sound has been recorded and then changed into code that computers can read, understand and recreate.
	MP3	Process of taking two or more groups of data and combining them into a single unified set
	WAV	An audio file format
	MIDI	Musical Instrument Digital Interface
	data structure	A data structure is a data organisation, management, and storage format that enables efficient access and modification
	conditional	A simple form of a computer decision is called a conditional.
	multitask	Many things at once.
	Concurrently	Work at the same time.
	process	The instance of a computer program that is being executed by one or many threads
	interpret	A computer program that directly executes instructions written in a programming or scripting language