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| **St Thomas of Canterbury Progression in Computing** |
| National curriculum expectations → | **Aims**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.
 | **KS1**Pupils should be taught to: * understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions
* create and debug simple programs
* use logical reasoning to predict the behaviour of simple programs
* use technology purposefully to create, organise, store, manipulate and retrieve digital content
* recognise common uses of information technology beyond school
* use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.
 | **KS2**Pupils should be taught to: * design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
* use sequence, selection, and repetition in programs; work with variables and various forms of input and output
* use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
* understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
* use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
* select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information
* use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.
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| **Skills** | **Essential** | **Computer Science** | **Information Technology** | **Digital Literacy** | **Key Vocabulary** |
| **Year 3** | The children learn: * to be more independent and are encouraged to attempt to fix a problem they may have before asking for help on their device.
* about different media and file types.
 | Computational Thinking The children learn: * to create a detailed flow diagram using the correct symbols.
* to turn an algorithm into a simple program on a digital device.
* about testing the program and recognising when it needs to be debugged.

Coding The children learn: * to create their own sprite in Scratch/ Scratch Jr.
* about sequencing commands and adding a repeat command in a program.
* how to refine/ improve a program by using the repeat command.
* how to create a variable.
* to create a program that contains selection, inputs and outputs.

Logical ReasoningThe children learn: * about using logical reasoning to detect potential problems in an algorithm or program which could result in something going wrong and then offer ideas of what is needed to fix/ debug it.

NetworkingThe children learn: * the World Wide Web is only one part of the Internet, the part that contains websites.
* to send an email and understands how this works.
* how information travels through computer networks.

OnlineThe children learn: * about key words.
* that search engines try to put the most useful websites at the top.
 | Harnessing TechnologyThe children learn: * to create digital content using a range of mixed tools/media and how to improve its design.
* to be creative and independent while using unfamiliar apps or technology to create content.
* to create a plan/ storyboard when producing digital content.
* to design a simple questionnaire to collect information, and display the information in a graph or table.
* to add information to a database.

OnlineThe children learn: * that the top search results can be manipulated and are based on things like most popular, recently updated.
* about filtering results by adding more detail or using advanced tools. to use search engines to collect information.
 | Technology in the real worldThe children learn: * that the internet is a computer network.
* that the internet can provide multiple services, such as the world wide web, streaming music/ video and email.
* to explore a web site’s journey from first request to appearing on the screen.
* advanced web terminology e.g. URL.

Media & ContentThe children learn: * how to make judgements about the usefulness and accuracy of information.
* about the term ‘fake news’.
* about what copyright is and why we have copyright laws.
* to recognise copyright material.

Online SafetyThe children learn: * the SMART rules about using the internet safely and responsibly.
* what personal information is and what they shouldn’t be sharing.
* they should pause before posting and consider the potential consequences.
* who they should seek help from about online concerns.
* the correct and sensible choice when presented with hypothetical scenarios.
* how to send and reply to online messages, such as email, respectfully and understand the difference between online and face-toface.
* how to use the safety features of websites as well as reporting concerns to an adult they trust.
* what online bullying/ cyberbullying is and some of the forms it can take.
* how to report any concerns and who they consider a trusted adult.
* they need to have a balanced approach to their use of technology.
* to make good choices about how long they spend online.
* to recognise websites and games appropriate for their age. E.g. PEGI rating.
* online accounts need to be signed in to and why passwords should never be shared.
* what makes a secure password and why they are important.
* how to use a password security checking tool.
* what represents an online identity E.g. images, username, information shared and digital footprint. to post positive comments online.
 | Block, palette, code/coding, command, decomposition, sprite, stage, condition, control block, costume, digital content, simulation, hyperlink, attachment, URL, blog/blogging, consequences, illustrator, untrusted, cyberbully, cyberbullying, reliable, MegaByte, GigaByte, report, sceptical, verify, fake news, soundtrack, VR (virtual reality), font, shortcut, shots, 360º Video, authenticate, multimedia. |
| **Year 4** | The children learn: * about physical input and output slots on a device. E.g. USB, HDMI, etc.
* about how to save their work in a range of locations.
* the best way to save their files. E.g. as an image (jpeg) to share online.
 | Computational Thinking The children learn: * to design a simple algorithm to show a real- life situation.
* about the valuable skills of abstraction and decomposition when tackling more complex problems.

Coding The children learn: * about the structure of a program and learn to plan in logical, achievable steps.
* to write a complex program, incorporating features such as selection, inputs, repetition, variables and procedures.
* attempt to debug their own programs and corrects/ debugs errors in code.

Logical ReasoningThe children learn: * to recognise an error in an existing program and attempt to debug/ fix the program.
* to investigate existing programs, evaluating them and consider how they could be improved.

NetworkingThe children learn: * about the key services that can be used to communicate on the internet.
* to recognise the main components (hardware) which allow computers to join and form a network.

OnlineThe children learn: * that search engines use algorithms to sort websites.
 | Harnessing TechnologyThe children learn: * to produce documents, media and presentations with increasing independence and competency that present data/ information.
* to use a keyboard confidently and make use of tools such as a spellchecker.
* about new forms of technology E.g. AR, Virtual Reality, Wearable Technology etc.

OnlineThe children learn: * to search for and use information from a range of sources.
* about making notes from information found on websites to present their findings.
* that not all sources of information including websites are accurate and can check information using a different sites.
 | Technology in the real worldThe children learn: * to differentiate between apps that use the Internet, the school network or that are self contained on a device.
* to use computing to communicate and collaborate.
* about documents and methods of collaboration over the internet e.g. blog

Media & ContentThe children learn: * more about what Fake News is, it's purpose and that Fake News can be found on all media.
* how to identify Fake News.
* that data can be manipulated to make Fake News appear to be true.

Online SafetyThe children learn: * the potential risks and ways they can protect themselves and friends from harm online.
* the safety features of websites and apps. e.g. block or report.
* they should report concerns to a trusted adult.
* the Internet is a great place to develop rewarding relationships.
* not to reveal private information to a person they know only online.
* that friends/followers profiles may not reflect the truth about their real lives.
* the term ‘digital footprint’ and that the information they put online leaves a digital footprint or “trail” which can be positive and negative.
* to search for their own name and usernames in Google to test their digital footprint.
* how they should act appropriately & respectfully online.
* how to deal with online bullying. how photos can be altered digitally and the creative upsides of photo alteration, as well as its power to distort perceptions of beauty and health.
* why copyright laws exist and presenting others work as one’s own is called plagiarism.
* to use a copyright free image gallery, or they can change the search criteria.
* the positive and negative effects technology may have on their health.
* why they need to ask a trusted adult before downloading files and games from the Internet. E.g. virus.
* to choose a secure passwords. why using an avatar and online name is advisable.
 | Logical reasoning, audio, selection, page ranking, hacker, repetition (sometimes referred to as ‘iteration’ in upper KS2), script, scripts area, secure (https), PEGI, netiquette, conditional, scene, filters, griefing, storyboard, cloud computing, positive online communication, online persona, digital footprint, animation, age restrictions, social network, screenshot, screencast |
| **Year 5** | The children learn: * how to create a QR Code.
* about uploading work to a cloud or blog.
* advanced techniques to tell a story using technology/ multiple apps.
* about advanced film making elements such as sound and lighting.
 | Computational Thinking The children learn: * to explore problem solving and decomposition.
* to independently plan, write and test their algorithms and create more complex programs, debugging as needed.
* about controlling / simulating physical systems and using sensors with multiple outcomes.

Coding The children learn:* to create their own complex game within Scratch or other block based coding app that uses variables, event handling, selection (“If” and “Then”), procedures and repetition (loops) to increase programming possibilities

Logical ReasoningThe children learn: * to explore logical reasoning in greater depth and learn to give well thought-through explanations of any errors they identify in program code (using the correct terminology).

NetworkingThe children learn: * about software, hardware and types of connected computers.
* about how data travels via the internet including binary.
* more about the different parts of the Internet and services.
* to create a basic web page using HTML.

OnlineThe children learn: * key skills for using a search engine.
* about the settings that can alter your search results.
 | Harnessing TechnologyThe children learn: * to produce digital content in a given format e.g. podcasts, videos, AR, virtual reality, 3D, digital music or illustrations.
* about planning including elements that they may need to source from other services.
* to build on the skills they have already developed to create content using unfamiliar technology.
* to use a spreadsheet / database to collect, record data and to use simple formulae.

OnlineThe children learn: * to use complex searches and advanced tools to find, select and use information.
* check the reliability of information on the internet.
 | Technology in the real worldThe children learn:* about different online communication tools/apps and how they could be used for different purposes e.g. work and social.
* about working in a group using collaborative tools.

Media & ContentThe children learn: * about how and why information found on some sites will be biased.
* how to source copyright free materials to use in their digital projects.
* how to credit the use of websites in their work and why this should be done.

Online SafetyThe children learn: * to demonstrate and explain the importance of communicating kindly and respectfully.
* about the negative online behaviours such as bullying, trolling, griefing and harassment.
* about empathy and the effects of online bullying.
* anything they post online can be seen, re-shared, re-used and may have a negative effect on others.
* about the ‘Digital 5 a Day’ plan and that they need to have a balanced approach to their use of technology.
* what makes a secure username and password.
* why people set up fake accounts or copy others identities.
* what an online identity or internet persona is, e.g. social identity in online communities and websites (Facebook, Instagram, YouTube etc) including photos and posts.
* how to avoid being tricked by scammers online. E.g. Phishing emails.
* to explain why an app may be free but have in-app purchasing and what that is.
 | Abstraction, vlog, YouTuber, IP address, pixels, vector, HTML, CSS, services, ISP, LAN, TCP/IP, variables, hub, peripheral, bandwidth, CEOP, ChildLine, cache, harassment, plagiarism, infringe copyright, illegal downloads, streaming, blocking, victim, cookie, junk mail, RAM / ROM, USB, ZIP, augmented reality, bit & bytes, upload, score, podcast, edit. |
| **Year 6** | The children learn: * about collaboration and sharing documents with other children in order to create digital content.
* advanced features of common office/ classroom apps.
 | Computational Thinking The children learn: * to create complex algorithms and turn their designs into a program (incorporating variables, procedures and different forms of input and output).

Coding The children learn: * about complex programs and are encouraged to persevere when solving difficult problems even if the solution is not obvious.
* about executing and adapting common commands using a text-based language e.g. Python/Javascript/ SwiftPlayground.

Logical ReasoningThe children learn: * to independently use logical reasoning to detect and correct errors in an algorithm and program.
* that there is often more than one way to solve a problem in an algorithm or program.

NetworkingThe children learn: * in more detail about how information/data is transported on the Internet and between computers using packets and IP addresses.
* about the opportunities computer networks and the internet offer for communication and collaboration.

OnlineThe children learn: * to explore advanced features within search engines and learn to use them effectively.
* how search results are selected and ranked by algorithms.
 | Harnessing TechnologyThe children learn: * to create digital storyboards with a complete narrative of the project or investigation.
* to confidently identify the potential of unfamiliar technology to increase their creativity.
* to source, store and combine copyright free images from the internet.
* to independently select, use and combine the appropriate technology/app tools to create effects that will have an impact on others and tell a story

OnlineThe children learn: * to use complex searches, filters and advanced tools to find, select and use information
 | Technology in the real worldThe children learn: * about digital crimes and threats that might exist online. E.g. worms, trojans, viruses, spyware, ransomware and malware.
* about anti-virus software and how they can help protect devices from infection.
* advanced web terminology e.g. firewall, security updates, pop up blocker, scams, phishing, HTTPs, location based settings, in app purchasing, trolling, filtering etc.

Media & ContentThe children learn: * to explore in more depth the legal and moral reasons not to plagiarise or infringe copyright and the impact it can have on the creator of the content.

Online SafetyThe children learn: * the advice they should/would give friends about making good choices online.
* the consequences of making poor online choices. E.g. Online bullying, Inappropriate comments (racially or sexually orientated), uploading inappropriate material (adult / illegal / antisocial ), accessing inappropriate sites (anti-social or illegal behaviour / adult content) and breaching copyright laws.
* the way men and women can be stereotyped in movies and TV.
* when to seek help from a trusted adult and not to try and deal with online situations on their own.
* how to block and report inappropriate comments or behaviour online.
* how to maintain healthy positive relationships with others while online.
* behaviours and strategies to prevent and stop online bullying.
* to list the websites and agencies they can contact in case they need help.
* what steps they can take to create a ‘positive online image’ including defining acceptable and unacceptable online behaviour and the benefits this will have to them now and in the future.
 | Antivirus, new media, collaboration, visual coding, text based coding, adware, trojan, feedback, bot, boolean, checksum, server, firewall, generalisation, security updates, plug in, pop up blocker, scams, phishing, location based settings, in app purchasing, trolling, sexting, exclusion, doxxing, catfishing, flaming, fabotage, creeping, dissing, ghosting FTP, filtering, malware, screen time, balanced lifestyle, configuring. |