Computing Rationale

God's Love in Action

Our children are at the heart of everything we do through **Christian values and relationships**. **Living and learning together** we celebrate the uniqueness and diversity of everyone in our family. We nurture a sense of **self belief, mutual respect and belonging** through Social Emotional Learning and academic excellence. We are dedicated to building the foundations for **happy and successful life-long learning**.

Contents

1. Curriculum Vision

In a world where technology is constantly evolving, the pupils of St Thomas will embrace it rather than be intimidated by it.

Using the Kapow curriculum, alongside computing across the curriculum, encompassing computer science, information technology and digital literacy, we wish for our pupils to become creators and computer scientists who live and breathe technology.

Our vision is that computing at St Thomas flips the switch of excitement, intrigue, and ingenuity in our learners. Through regular training opportunities, our staff also share the same vision and, by encouraging our teachers to try and embed computing across the whole curriculum, this becomes a whole school journey to make learning more creative, exciting, and accessible. If we can provide opportunities in school for our pupils, who may not have these experiences outside of school, to use different forms of hardware and software, we may just kick-start a life-long passion and a career for the future.

It is our belief that the children first and foremost are taught how to use technology responsibly and safely; education is they key element in preventing the wide variety of issues we currently see with technology/social media. As educators, we need to face these issues head on and want our pupils to understand that there is always a choice with using technology. As a school, through our own social media uses such as classroom dojo, we model positive practice and showcase children's learning throughout school.

We recognise that technology can allow pupils to share their learning in creative ways. In conjunction with our themes, we want our pupils to be fluent with a range of tools to best express their understanding – we are constantly looking at ways to present work in a more creative way. This is in the hope that by the end of Key Stage 2, the children of St Thomas have been exposed to a range of hardware, software and, most importantly, they have been switched on by computing.

2. National Curriculum

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 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.

3. Intent

Why do learners at St Thomas CE need to study Computing?

Many aspects of the modern world are run by technology. We see it in every aspect of our lives: from supermarket self-scanners to QR codes and social media. The internet is constantly at our fingertips. Many of the pupils from our school family are digital connoisseurs as they have constant access to technology and the Internet. It is likely that many of our children's future careers are going to be heavily influenced and involved in technology. With the many risks posed with the ever-changing developments within online communication, we need to ensure that our pupils keep themselves safe as they use social media and collaborative gaming. By studying computational thinking through programming, pupils learn how to recognise problems and approach them in a controlled and systematic way.

EYFS

Early Learning Goal:

• Children recognise that a range of technology is used in places such as homes and schools. They select and use technology for purposes.

Key Stage 1

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

Key Stage 2

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.

4. Implementation

Our computing curriculum follow the three national curriculum areas:

Digital Literacy

Information technology

Computer Science

These are then broken down into key areas of our sequenced curriculum:

Computing systems and networks

Programming

Creating Media

Data Handling

Online Safety

Within the lesson, teachers follow the planning and resources provided by Kapow using modelled handover as a process to prepare the students for independent application of the steps needed to achieve.

I (Model/Guided Discourse)	The class teacher will **model explicitly** how to achieve the lessons learning objective and empower children to with the knowledge required to do so. Name the steps need to achieve the learning objective.
We	Children are provided with an opportunity to **rehearse** the lesson objective with other children to embed the skill being taught with **support from peers**. This allows the class teacher to circulate with purpose and **check whole class understanding** through QFT methods whilst all children are on task.
You	All children can **independently apply** their new skill into their own work to demonstrate they have understood the learning objective.

Throughout the lesson the teacher uses responsive teaching methods to check for understanding, these include:

- Cold calling.
- Think, pair, share.
- Show me boards.
- Probing and processing questioning.

We want our children to have an expansive vocabulary and through teacher modelling and planning, children are given opportunity to use and apply appropriate vocabulary. Computing language is taught and built upon with vocabulary being a focus. Utilising Kapow, the school explicitly teachers Tier 2 and Tier 3 vocabulary in computing.

Unit	Year 1 - Key Vocabulary
Computing systems and networks: Improving mouse skills	**account,** click, **ctrl, cursor,** drag, drag and drop, **digital photograph,** drop, **duplicate**, keyboard, **layers,** log on/ in, log out/ off, menu, mouse, mouse pointer, password, right click, screen (monitor), software, **tool,** username
Programming 1: Algorithms unplugged	algorithm, **automatic,** bug, **chunks, clear, code,** debug, **decompose, decomposition**, device, directions, **input**, instructions, **manageable, motion, order, organise, output, precise,** programming, problem, **robot, sensor,** sequence, **solution, specific, steps, tasks, virtual assistant**
Skills showcase: Rocket to the moon	**annotate, cells, components, create, data,** debug, **designing, digital content, digital image, document, e-document, edit, editing program, evaluate, folder,** input, instructions, log in, photo, program, order, robot, **save**, sequence, **share, software, spreadsheet, table**
Programming 2: Bee-Bots	algorithm, **artificial intelligence, Bee-Bot,** clear, code, debug, **demonstration, filming,** inputting, instructions, **pause**, precise, **predict, program, tinker, video, video recording** (Option 2 only: **emulator, virtual**)
Creating media: Digital imagery	**Background, blurred, camera,** clear, **crop,** delete, **device, digital camera, download,** drag and drop, **edit, editing software, filter, image, import, internet, keyword, online, photograph, resize, save as,** screen, **search engine,** sequence, software, **storage space, visual effects**
Data handling: Introduction to data	**bar chart, block graph, branching database, categorise, chart,** click and drag, **compare, count, data, data collection, data record, data representation,** edit, input, keyboard, line graph, mouse, information, label, **pictogram, pie chart, process,** record, resize, **sort,** table, **tally, values**
Online safety	communicate, **connect, console,** devices, **digital footprint, emotion, feelings,** instructions, internet, **internet safety, laptop, mood,** online, **personal information, phone, posting,** predict, **respect, sharing, smart device, smartphone, smart TV, smartwatch, strangers**, tablet, **trust, wired, wireless**

Unit	Year 2 - Key Vocabulary
Computing systems and networks 1: What is a computer?	**battery,** buttons, camera, computer, **desktop**, device, **digital, digital recorder, electricity, function,** input, invention, keyboard, l**aptop, monitor,** mouse, output, **paying till, scanner, screen, system,** tablet, **technology, video,** wires
Programming 1: Algorithms and debugging	**abstraction**, algorithm, artificial intelligence, bug, clear, correct, data, debug, decompose, error, **key features, loop,** predict, **unnecessary**
Computing systems and networks 2: Word processing	**backspace, bold, copy, copyright, cut,** delete, **forward button, highlight, home row, home screen,** image, import, **italics,** keyboard, **keyboard character, keyword, layout, navigate, paste, redo,** search, **space bar, text, text effects, touch typing, underline, undo, word processing**
Programming 2: Scratch Jr	algorithm, animation, **blocks**, bug, button, **CGI, computer code,** code (verb), debug, **fluid, icon, imitate,** instructions, loop, '**on tap**', programming, repeat, **Scratch JR,** sequence, sound recording
Creating media: Stop motion	**Animation, animator, background, digital device, drawing, flipbook, frames, moving images, opinion skinning, still images** (Option 1- as above,plus: decompose, **object, plan**) (Option 2- as above, plus: decompose, digital camera, **duration, focus,** import, object, plan, save, **upload**) (Option 3- as above, plus: debug, effects, evaluate, **fluid, pen tool, static**)
Data handling: International space station	algorithm , **astronaut,** data, digital, digital content, **experiment, galaxy, insulation, interactive map, International Space Centre, International Space Station, interpret, laboratory,** monitor, **planet, satellite,** sensor, **space, temperature, thermometer, water reservoir**
Online safety	**accept, comment, consent, content, deny, emojis, offline,** online, password, **permission,** personal information, **pop-ups, pressure,** private information, **reliable,** share, **terms and conditions, trusted adult**

Unit	Year 3 - Key Vocabulary
Computing systems and networks 1: Networks and the internet	cables, component, connection, **corrupted,** data, desktop, device, **DSL (digital subscriber line), fibre,** file, internet, laptop, **network, network map, network switch, packets, radio waves, router, server, submarine cables,** tablet, **text map, The Cloud, web server, website, website trackers, WiFi,** wired, wireless, **Wireless Access Points, World Wide Web**
Programming: Scratch	algorithm, animation, **application**, code, code block, **coding application,** debug, decompose, **interface,** game, loop, predict, program, remixing code, repetition code, review, **Scratch,** sprite, tinker
Computing systems and networks 2: Emailing	**attachment, bcc (blind carbon copy) cc (carbon copy), compose,** content, **cyberbullying,** document, **domain, download, email, email account, email address, emoji,** emotions, **fake,** font, **genuine, hacker,** icons, **inbox,** information, **link,** log in, log out, **negative language,** password, personal information, **positive language, reply, responsible digital citizen, scammer, settings, send, sign in, spam email, subject bar, theme, tone, username, virus,** WiFi
Computing systems and networks 3: Journey inside a computer	algorithm, **assemble, CPU (central processing unit),** data, decompose, desktop, **disassemble, GPU (graphics processing unit), hard drive, HDD (hard disk drive),** infinite loop, input, keyboard, laptop, **memory, microphone,** monitor, mouse, output, photocopier, program, **QR code, RAM (random access memory), ROM (read only memory), storage,** tablet device, technology, **touchscreen, touchpad**
Creating media: Video trailers	application, camera angle, **clip,** edit,**film editing software, graphics,** import, key events, photo, plan, recording, **sound effects,** storyboard, **time code, trailer, transition,** video, **voiceover** (Option 1 - as above, plus: **cross blur, cross fade, cross zoom,** desktop, digital device, **dip to black, directional wipe,** laptop) (Option 2 - as above, plus: **cross dissolve, fade to black/white , slide, wipe**)
Data handling: Comparison cards databases	categorise, category, chart, data, database, **fields , filter,** graph, information, **interpret, PDF, questionnaire,** record, representation, sort, spreadsheet
Online safety	accurate, **age restricted, autocomplete, beliefs, block,** content, digital devices, **fact, fake news,** internet, **opinion,** password, persuasive, **privacy settings,** reliable, **report, requests,** search engine, **security questions,** sharing, smart devices, **social media platforms, social networking, wellbeing**

Unit	Year 4 - Key Vocabulary
Computing systems and networks: Collaborative learning	animations, **average**, bar chart, **collaboration**, comment, **conditional formatting, contribution,** data, **edited,** email account, **format, freeze,** icon, images, **insert,** link, **multiple choice, numerical data,** pie chart, **presentations, resolved, reviewing comments,** share, **slides,** software, **spreadsheets, suggestions, survey, teamwork, themes, transitions** (Microsoft version add in: **rating**)
Programming 1: Further coding with Scratch	**broadcast block,** code blocks, **conditional, coordinates,** decomposition, **features,** game, information, **negative numbers, orientation, parameters, position,** program, project, **script,** sprite, **stage,** tinker, **variables**
Creating media: Website design	**assessment, audience,** collaboration, content, contribution, create, **design, embed,** evaluate, features, **hyperlinks,** images, insert, online, plan, **progress,** review, **web page,** website, World Wide Web (Google version add in: **checklist, Google Sites, hobby, homepage, published,** record, **style, subpage, tab,** theme) (Microsoft version add in: **design view,** information, **Microsoft Sway, stack, storyline view,** style, **transform, web browser**)
Skills showcase: HTML	code, component, content, copyright, **CSS, end tag,** fake news, **hacking, heading, headline, hex code, HTML,** input, **internet browser,** output, **paragraph,** permission, **remixing,** script, **start tag, tags,** text, **URL, webpage**
Programming 2: Computational thinking	abstraction, algorithm, code, **computational thinking,** decomposition, input, **logical reasoning,** output, **pattern recognition,** script, sequence, variable
Data handling: Investigating weather	accurate, **backdrop, climate zone, cold,** collaboration, **condensation, cylinder, degrees, evaporation, extreme weather, forecast, heat sensor, lightning, measurement, pinwheel, presenter, rain,** satellite, **script, sensitive, sensor data, solar panel,** tablet/digital camera, temperature, thermometer, **tornado, warm, weather, weather forecast, wind**
Online safety	**accuracy, advantages, advertisements, belief, bot, chatbot,** computer, **distractions,** fact, **hashtag, implications, in-app purchases, influencer,** opinion, program, **recommendations,** reliable, **risks, screen time, search results, snippets, sponsored, trustworthy**

Unit	Year 5 - Key Vocabulary
Computing systems and networks: Search engines	algorithm, **appropriate,** copyright, correct, **credit, data leak, deceive, fair,** fake, **inappropriate, incorrect, index,** information, **keywords,** network, **privacy, rank, real,** search engine, **TASK, web crawler,** website
Programming 1: Music	**beat, bugs, coding, command,** debug, decompose, error, instructions, loop, **melody, mindmap,** music, output, **performance, pitch, play,** predict, programming, **rhythm, tempo, timbre,** tinker, **tutorials,** typing (Sonic Pi version add in: **buffer,** format, **live loops, rehearsal, repetition, sleep, Sonic Pi, soundtrack, spacing, typo**) (Scratch version add in: plan, repeat, scratch, **soundtrack, spacing**)
Data handling: Mars Rover 1	**8-bit binary, addition, ASCII, binary code, boolean, byte,** communicate, **construction, CPU, data transmission, decimal numbers,** design, **discovery, distance, hexadecimal,** input, instructions, internet, **Mars Rover, moon,** numerical data, output, planet, **radio signal, RAM, research, scientist,** sequence, **signal, simulation,** space, **subtraction,** technology, **transmit**
Programming 2: Micro:bit	algorithm, animation, **app,** blocks, **bluetooth,** code block, connection, create, debug, decompose, designing, desktop, device, download, images, input, instructions, laptop, **load,** loop, **Micro:bit, outputs, pairing, pedometer, polling,** predict, program, repetition, **reset, sabotage, scoreboard,** screen, **systematic,** tablet, **tinkering, USB,** variables, wifi, wireless, wires
Creating media: Stop motion	animation, **animator,** background, **character,** decomposition, design, edit, evaluate, **flip book, fluid movement, frame, model,** moving images, **still image,** storyboard, **thaumatrope, zoetrope** (Option 1 add in: digital device, onion skinning, stop motion) (Option 2 add in: effects, photos, script)
Skills showcase: Mars Rover 2	**3D,** algorithm, **binary image, CAD, compression,** CPU, data, drag and drop, **"Fetch, decode, execute", ID card,** input, **JPEG,** memory, **online community, operating system,** output, **pixels,** RAM, **responsible, RGB, ROM, safe**
Online safety	**accurate information, advice, app permissions,** application, **apps, bullying, communication,** emojis, **health,** in-app purchases, information, **judgement, memes, mental health, mindfulness, mini-biography, online communication,** opinion, **organisation,** password, personal information, **positive contributions,** private information, **real world, strong password, summarise, support,** technology, trusted adult, wellbeing

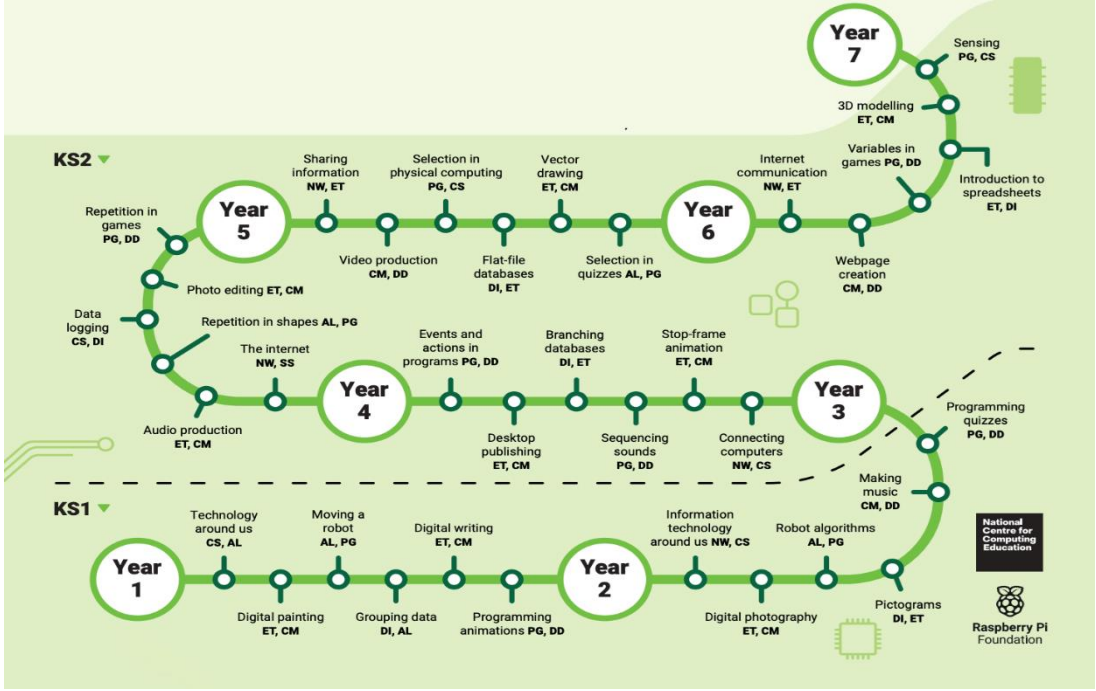
Unit	Year 6 - Key Vocabulary
Computing systems and networks: Bletchley Park	**acrostic code, brute force hacking, caesar cipher, chip and pin system, cipher,** code, **combination, contribute, convince, date shift cipher,** discovery, **hero,** invention, **Nth Letter Cipher,** password, **Pig Latin, Pigpen cipher, present, scrambled, secret,** secure, **technological advancement, trial and error**
Programming: Introduction to Python	algorithm, code, command, design, import, **indentation,** input, instructions, loop, output, patterns, **random, remix,** repeat, **shape**
Data handling 1: Big data 1	algorithms, **barcode,** binary, Boolean, **brand, chips, commuter, contactless,** data, **encrypted, infrared, MagicBand,** privacy, **proximity,** QR code, **QR scanner,** radio waves, **RFID,** signal, **systems/data analyst, transmission,** wireless
Creating media: History of computers	**background noise,** byte, computer, devices, file, **FX, gigabyte,** graphics, hard drive, **hardware, kilobytes, megabyte, memory storage,** mouse, operating system, **overlay,** play, **processor, radio play,** RAM, **Raspberry Pi,** record, **reverb,** ROM, script, smartphone, **sound,** sound effects, **terrabytes, touch screen, track, trackpad,** trailer
Data handling 2: Big data 2	Big Data, bluetooth, corrupted, data, **energy, GPS, improve,** infrared, **Internet of Things,** personal, privacy, QR codes, **revolution,** RFID, **SIM,** simulation, **Smart city, Smart school,** stop motion, **threat,** wifi, wireless
Skills showcase: Inventing a product	**adapt, advert,** algorithm, bugs, coding, **debugging,** design, edit, **electronic,** evaluate, **facts, image rights,** images, **influence,** information, **inputs,** loops, **manipulation, opinions,** output, photos, **product,** program, repetition, **screenshot,** search engine, **selection,** sequence, snippets, software, **structures,** variables, video, website
Online safety	**anonymity, antivirus, biometrics, block and report,** consent, copy, cigital footprint, **digital personality, financial information,** hacking, inappropriate, **malware,** online bullying, online reputation, password, paste, personal information, **personality, phishing,** privacy settings, private, **reliable source,** report, **reputation,** respect, **scammers, screengrab,** secure, settings, **software updates, two factor authenication,** URL, username

5. Impact and assessment

Children's progress is not only assessed through questioning and monitoring. It is also assessed at the end of each unit, which identifies the children who need extra support, or those who have excelled and require more challenge. This informs the teacher on their summative assessment tracker, which is completed after every unit.

Often the work is built upon each week to create a final product by the end of the unit. The children love computing and really engage with the subject. Children often take part in a showcase unit, which combines the feature aspects of all the key five areas of computing.

Computing is an always evolving area in the world. The children will leave our school ready with a firm understanding of basic computer science, information technology and digital literacy.



Computing Rationale

6. Staff CPD

All teaching staff receive 1:1 instructional coaching, delivered by a trained coach from the senior leadership team. These fortnightly meetings follow a programme based around cognitive load theory and quality first teaching. Staff questionnaires and audits are completed at two points in a year, to signpost subject knowledge support. Subject leaders have a 1:1 session, each half term, with senior leaders, to develop action plans and support for their curriculum area. Teachers also receive 1:1 coaching with either the subject lead or our lead practitioner in planning and delivering a science unit.

Teachers are provided with:

- Resources and planning from Kapow Primary.
- Demonstration videos from Kapow Primary.
- Equipment matching the Kapow Primary programme.
- CPD with subject leaders and SLT.
- Online training videos for CPD.