



# SAINT JOHN WALL CATHOLIC SCHOOL

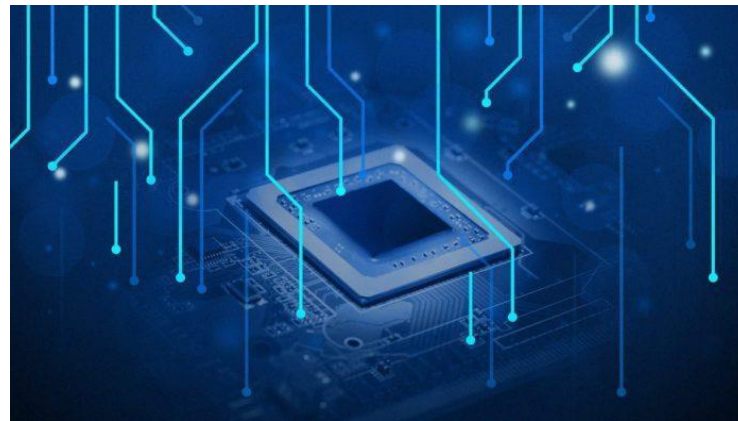
## *A Catholic School For All*



### Departmental Schemes of Work

**Curriculum Intent:** “To educate each and every unique child in our care to hear and respond to what God calls them to be”.

### KS3 Computing



#### **Genesis 11:6**

And the Lord said, “Behold, they are one people, and they have all one language, and this is only the beginning of what they will do. And nothing that they propose to do will now be impossible for them.”

# Computing (*Computer Science, IT, iMedia*) Curriculum Intent

| Mission Statement     | School Curriculum Intent   | Computer Science Curriculum Intent  |
|-----------------------|--|---|
| <b>'To educate</b>    | Our skilled teachers and support staff live out their vocation to serve and teach children and young people at Saint John Wall Catholic School           | <p><i>The Computing department have two Computer Science subject specialists with skills and experience, from both teaching and working within the industry, to provide the best academic and vocational curriculum. The curriculum is designed in line with DfE requirement of what should be taught within KS3 Computing and the 3 strands of Computer Science (CS), Information Technology (IT) and Digital Literacy. This enables learners to be prepared to select either CS or IT as a pathway in KS4 yet still be digitally literate for all aspects of education and the wider world.</i></p> <p><i>Schemes of work take account of the school's Assessment &amp; Reporting calendar to build fluency in knowledge and skills along with preparing learners for submission of internal qualification assignments. Teachers use the Rosenshine Principles to help learners retain the information they have been taught, combined with cognitive science theory (recall, manageable, links) to plan teaching and learning strategies which allows for the transfer of knowledge from short term to long term memory.</i></p> |
| <b>each and every</b> | We are 'A Catholic School For All' and we welcome learners from each and every diverse background, faith and culture into the Saint John Wall community. | <p><i>Computing as a subject is underrepresented by both girls and ethnic minorities, this is something the we actively challenge. We have taken active steps to attract more girls into computing e.g. taking part in research, girls only masterclasses, BBC girls in IT event. Within every lesson taught to learners, our aim is to make sure that the SJW values and the Catholic ethos is incorporated and along with other STEM subjects, we use the Values@Days to promote inclusivity and diversity for our fields. When providing learners with information about the history and industry within the field, we as teachers make sure that we showcase a diverse representation of both ethnicity and gender.</i></p>   |
| <b>unique child</b>   | We value human dignity and recognise every child as a unique individual made in the image of God.  | <p><i>The curriculum is designed to ensure that all learners can access the learning within the subject, regardless of SEND and EAL needs eg; providing pupils with videos and models to support independence in and outside of the classroom; also taking advantage of technology such as Microsoft immersive reader/translator. Computing connects learning across the curriculum including maths and numeracy in many ways, such as using binary numbers, data, logical thinking and patterns. Learners' knowledge is further developed with subject specific terminology, where key words are defined and used to ensure that learners can apply key vocabulary to the subject. In some lessons, literacy skills are developed through reading articles or using other DARTs related strategies.</i></p>  |
| <b>in our care</b>    | We provide high levels of care within a respectful and disciplined environment to safeguard children's wellbeing, welfare and safety.                    | <p><i>For staff within the department, the safety/safeguarding of learners is paramount. We as teachers are always on the lookout to make sure that learners in our care are safe from any danger, and concerns are always reported. Within lessons high expectations are set for all learners regarding their behaviour to ensure a positive attitude towards maintaining a safe environment for learning, where learners can achieve and fulfil their potential. Specific to Computing is the factor of Online safety, to which we have a responsibility to monitor in lessons through tools such as imperio, but also educating pupils on what it is to be safe, respectful and lawful online.</i></p>   |

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| <p><b>to hear</b></p>                       | <p>We instil SJW values and encourage spiritual, moral, social, cultural and emotional personal development so that our young people are open to hear God’s calling.</p>   | <p><i>The experience of staff from teaching and working within industry, allows teachers to provide learners with insight of how this subject helps them in the real world, and how the school values is at the core of working within the profession, for example recognising the wonder of technology, the rapid benefits it brings, as well as ethical use of technology. Every lesson includes links to relevant vocations where learners can explore how the knowledge and skills of that lesson can be applied to occupations in this field. One of the core threads in computing is the legal and ethic of the use of IT, this looks at areas such as the morale, social, and cultural impacts IT has on the world around them. Code club is an enrichment activity we allow pupils to attend where they explore areas of computing not in our curriculum. This includes game developing, cyber security and the work with robotics allowed the attendees to attend a robot competition as RAF Cosford.</i></p>   |
| <p><b>and respond</b></p>                   | <p>We foster our young people’s gifts and talents so they are equipped with skills, knowledge and qualifications to create opportunities to be able to respond to God’s calling.</p>   | <p><i>Our subject allows learners to develop transferable skills both through digital literacy but also the problem-solving side of computer science. Both of which will support any vocation they would undertake in the future. We want learners to be able to: Understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation. Analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems. Evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems. Be responsible, competent, confident and creative users of information and communication technology. Qualifications we offer are GCSE Computer Science, CNAT iMedia (ending with leavers 23) replaced with CNAT Information Technology.</i></p>   |
| <p><b>to what God calls them to be’</b></p> | <p>Taking Jesus Christ as a role-model we help learners understand what God calls them to be; informed responsible citizens whose vocation in life contributes to peace, tolerance, justice and service in both our local community and wider society.</p> | <p><i>Computing ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world. There are many career and further education pathways that are related to computing (website developer, IT technician, software developer, social media manager). Learners could study computer science related subjects within college or use their skills in apprenticeships. The subject allows for an overall understanding of modern technology which should allow learners to move into specific areas of computer science at post 16 and 18. Our aim here at SJW is to provide a platform for all our learners to become the best they can and achieve their dream, albeit within our subject or any other discipline, because we believe by studying computing and by extension IT and CS, the knowledge and skills learnt can be transferred to whatever career they choose. Computing at KS4 provides 2 pathways, the academic GCSE CS and the vocational IT, giving all learners the chance to further pursue computing regardless of ability.</i></p> |

## Computing KS3 Programme of Study

Pupils should be taught to:

|           |   |  |
|-----------|---|--|
| <b>CS</b> | 1 | design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems   |
| <b>CS</b> | 2 | understand several key algorithms that reflect computational thinking [ <i>for example, ones for sorting and searching</i> ]; use logical reasoning to compare the utility of alternative algorithms for the same problem  |
| <b>CS</b> | 3 | 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 [ <i>for example, lists, tables or arrays</i> ]; design and develop modular programs that use procedures or functions |
| <b>CS</b> | 4 | understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming;   |
| <b>CS</b> | 5 | understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [ <i>for example, binary addition, and conversion between binary and decimal</i> ]   |
| <b>CS</b> | 6 | understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems  |
| <b>CS</b> | 7 | 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  |
| <b>IT</b> | 1 | 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                                   |
| <b>IT</b> | 2 | create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability  |
| <b>DL</b> | 1 | 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   |

## SUMMARY

Computational Thinking

Algorithms

Programming

Logic gates

Binary

Hardware, Software, Networking

Data Representation

Creative project

Web Browse effectively

E-safety

## KS3 Computing

Computing, Enterprise, Media

### Sequencing of topics

Year7

National Curriculum

Topic

|   |  |                 |
|---|--|-----------------|
| 1 | Digital Literacy                                     | DL1, IT1, IT2   |
| 2 | Computer Systems ( <i>HW, CPU, SW, Networking</i> )  | CS6             |
| 3 | Online Safety ( <i>E-safety, Laws &amp; Ethics</i> ) | DL1             |
| 4 | Graphics (Photoshop)                                 | MEDIA, IT2      |
| 5 | Spreadsheet Modelling                                | ENTERPRISE, IT1 |
| 6 | Micro: Bits (physical computing, block based code)   | CS3, ROBOTICS   |

Year8

National Curriculum

Topic

|   |  |                 |
|---|--|-----------------|
| 1 | Web Development ( <i>RocketCake</i> )                        | MEDIA, IT1, IT2 |
| 2 | Dragons Den  | ENTERPRISE, IT1 |
| 3 | Python Pt1   | CS3             |
| 4 | Binary Data ( <i>Binary, Data rep, Boolean Logic</i> )       | CS4, CS5, CS7   |
| 5 | Python Pt2   | CS3             |
| 6 | Computational Thinking (Inc. searching & sorting algorithms) | CS1, CS2        |

### Calendared assessments

- All topics have 6 lessons including assessment at the end
- Exam style tests completed at the end of each topic.
- Either created and completed using MS Forms or through printed test papers
- When there is a Whole School assessment, questions related to knowledge of all topics taught to date will be included.

**Personal Development**  
(Cross curricular, Jesuit Values, SMSCV, cultural capital)

| Year 7                                     | Cross curricular   | SJW Values   | SMSC   | Cultural Capital   | Careers  |
|--|--|--|--|--|--|
| Digital Literacy                           | English – correctly writing emails and letters using work  | Eloquent and Truthful – How can I best use technology to communicate with others?            | Social - use social skills in different contexts/people.   | Exposure to new systems to communicate with people in a professional fashion.                  | Office Assistant - <a href="https://www.monster.co.uk/advertise-a-job/hr-resources/hr-strategies/job-descriptions/office-assistant-job-description/">https://www.monster.co.uk/advertise-a-job/hr-resources/hr-strategies/job-descriptions/office-assistant-job-description/</a> |
| Computer Systems (HW, CPU, SW, Networking) | Engineering/Electronics – looking at the components that are used to build a computer and how they interconnect. | Attentive and Discerning – Do I know how computer technology really works?                   | Spiritual - reflect on their experiences.<br>BAME Industry Leader: Raj Kalia<br>Chief executive, Broadband Delivery UK   | Being exposed and getting hands on look at the inside of real computers                        | IT Technician - <a href="https://www.betterteam.com/it-technician-job-description">https://www.betterteam.com/it-technician-job-description</a>  |
| Online Safety                              | Psychology/PSHE – knowing what is and is not healthy with regards to mental health in terms of online activity   | Compassionate and Loving – How do I talk to others digitally and how does it make them feel? | Spiritual - know/respect others faiths, feelings, values. Moral - right v wrong, legal boundaries of civil and criminal law, understand consequences of their behaviour, views about moral & ethical issues & others views.<br>BAME Industry Leader: Claudia Natanson - Information and cyber security specialist for Security Practitioners | Being made aware of the different digital experiences available but also the dangers of these. | Data Protection Officer - <a href="https://resources.workable.com/gdpr-data-protection-officer-job-description">https://resources.workable.com/gdpr-data-protection-officer-job-description</a>  |
| Digital Graphics                           | Graphics/Art/Media – use of digital image editing software in creative ways to convey a message                  | Grateful and Generous – can I appreciate the Art work of others?                             | Spiritual - use imagination/creativity in learning. Cultural - respond positively to artistic, musical, sporting, cultural opportunities   | Looking at the digital imagery from artists in different cultures.                             | Graphic Designer - <a href="https://www.truity.com/career-profile/graphic-designer">https://www.truity.com/career-profile/graphic-designer</a>   |
| Spreadsheet Modelling                      | Maths/Statistics/Business – working with numbers and currency to model scenarios and make business decision      | Intentional and Prophetic – Do I know how to manage resources and plan for the future?       | Moral - understand consequences of their behaviour   | Look at how money has to be managed in the world of work and that it isn't unlimited.          | Accountant - <a href="https://www.prospects.ac.uk/job-profiles/chartered-accountant">https://www.prospects.ac.uk/job-profiles/chartered-accountant</a>   |
| BBC MicroBits (physical)                   | Maths – looking at comparative operators and   | Curious and Active – what can be done with machines and                                      | Spiritual - enjoy learning about themselves, others, world around them   | Program robots using and learn about   | Robotics Engineer - <a href="https://resources.workable.com/robotics-engineer-job-description">https://resources.workable.com/robotics-engineer-job-description</a>  |

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|  | computing, block based code)                  | using numbers for distance and angles  | programming in the physical world?   | Cultural - appreciate cultural influences of own/others heritage  | Britain's computing heritage (BBC Micro).   |  |
|  |   |  |  |   |   |  |
|  | Year 8  | Cross curricular   | SJW Values   | SMSC  | Cultural Capital  | Careers  |
|  | Web Development (RocketCake)                  | Media – using interactive media to convey a message to a set audience  | Eloquent and Truthful – How can I best use technology to communicate to many others?   | Spiritual - use imagination/creativity in learning. Cultural - respect and learn about different faiths and cultural diversity in local/national/global communities | Creativity used when producing websites – site content can be looking at different cultures eg; holidays in other countries                                   | Web Developer - <a href="https://www.prospects.ac.uk/job-profiles/web-developer">https://www.prospects.ac.uk/job-profiles/web-developer</a>  |
|  | Dragons Den                                   | Business – developing an idea for a product using market research<br>Drama – pitching the product to a target audience               | Faith-filled and Hopeful – How can I have faith in my own ability and fill an audience with optimism.  | Social - use social skills in different contexts/people.  | Having a industry expert in (or virtually) to speak to pupils about the business world and their experiences. Business is beyond the KS3 National Curriculum. | Entrepreneur - <a href="https://www.prospects.ac.uk/jobs-and-work-experience/self-employment/what-is-an-entrepreneur">https://www.prospects.ac.uk/jobs-and-work-experience/self-employment/what-is-an-entrepreneur</a> |
|  | Python Pt1 (basic) & Python Pt2 (advanced)    | Maths – looking at comparative operators and using numbers, addition, subtraction, multiplication, division, decimals, variables     | Learned and Wise – What can I use from prior learning to help with new learning?<br>Learned and Wise – How can I extend new learning to make me a more efficient programmer? | Spiritual - reflect on their experiences.   | Having professional programmer in (or virtually) to speak to pupils about programming projects in industry.   | Programmer - <a href="https://www.truity.com/career-profile/computer-programmer">https://www.truity.com/career-profile/computer-programmer</a>   |
|  | Binary Data (Binary, Data rep, Boolean Logic) | Maths – looking at comparative operators and using numbers, addition<br>Electronics – using logic circuits to test Boolean equations | Curious and Active – how is the physical world translated to the digital world   | Spiritual - enjoy learning about themselves, others, world around them  | Create electronic circuits to see logic gates in action. Learn about Britain's computing heritage (Boole).  | Computer Engineer - <a href="https://www.betterteam.com/computer-engineer-job-description">https://www.betterteam.com/computer-engineer-job-description</a>  |



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|--|--|--|--|---|--|--|
|  | Computational Thinking (Inc. searching & sorting algorithms) | Maths – looking at comparative operators and using numbers, addition, division | Attentive and Discerning – How do algorithms fit in the wider world? How can we discern the most efficient way to complete a task? | Spiritual - reflect on their experiences. Cultural - appreciate cultural influences of own/others heritage<br>BAME Industry Leader: Anne-Marie Imafidon - chief executive and co-founder, Stemettes | Learn about Britain’s computing heritage (Lovelace). | Computer Scientist - <a href="https://targetjobs.co.uk/careers-advice/job-descriptions/454127-computer-scientist-job-description">https://targetjobs.co.uk/careers-advice/job-descriptions/454127-computer-scientist-job-description</a> |
|--|--|--|--|---|--|--|

**Progression model**

Over the 2 year Curriculum:

| <b>Topic</b>          | <b>What <i>knowledge</i> will pupils develop? (Including key terminology)</b>   | <b>What <i>skills</i> will pupils develop? (Including literacy &amp; Numeracy)</b>   |
|-----------------------|---|--|
| Digital Literacy      | login, folder structure, documents, web browser, email, send/receive/subject/attachment/inbox MS teams, MS Word, MS PowerPoint. formatting  | Log in to the network, use their email and MS teams, create a folder structure, be able to effectively use word and PowerPoint ( <b>LIT</b> )  |
| Computer Systems      | Input/Output Device, Storage device, Hardware, CPU, RAM, Motherboard, Hard drive, Software, operating system, applications, Networking, hub, ethernet cable, wifi, router modem, www, internet, LAN, WAN, packets, IP, server | Explain different hardware of a computer, explain the purpose of the OS v applications. Explain the components of a network. Explain the difference between the www and the internet   |
| Online Safety         | E-safety, Cyberbullying, Predators, Sexting, Social Media, Spam and Viruses, CEOP, ThinkUknow, digital footprint  | 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 |
| Digital Graphics      | Photoshop, JPEG, BITMAP, graphic, copyright, creative commons, tools, fade, quality, crop, hue/saturation, colour balance, brightness/contrast, gradient, filter, canvas, layers  | Follow the different copyright laws. Source high quality images, use Adobe Photoshop and its various tools to edit, manipulate and combine digital images ( <b>NUM</b> )   |
| Spreadsheet Modelling | Spreadsheet, row, column, cell, table, cell range, formatting, formulae, function, sort, filter, Graphs, Charts, condition formatting, data dashboard, tab  | Effectively use MS Excel to create spreadsheets for collecting and analysing data and producing a data dashboard utilising charts and graphs ( <b>NUM</b> )  |



|                        |   |  |
|------------------------|---|--|
| Micro: Bits            | BBC Micro:bits, block based code, If, Else, Variable, subprogram, rover, output, LED, Circuit   | Using block based code <b>(LIT/NUM)</b> to programme a BBC micro bit to serve various purposes, eg a small game, a compass, a sign. Combine the micro:bits with rovers to be able to code and control the rovers movement. |
| Website Design         | Dreamweaver, site, webpage, HTML, CSS, header, footer, Navigation, buttons, image, layout, embed, hyperlink, form   | Effectively use Adobe Dreamweaver to create a linked multi page website using a variety of sourced content for an intended audience and purpose.   |
| Dragons Den            | Enterprise, generate ideas, entrepreneurs Unique Selling Point, customers, competitors Marketing, tagline, product name, Media and Advertising, Investors, Presenting and pitches | Conduct market research, design a product, consider competitors and how to bring the product to market. Create a presentation and pitch the product <b>(LIT)</b>   |
| Python Basic           | Python, IDLE, variable, data type, print, input, math operators, if, elif, else, data type,   | Basic the programming techniques listed using Python and GUI IDLE. <b>(LIT/NUM)</b>  |
| Python Advanced        | While loops, For loops, l, Arrays, index, element, length, Procedures, parameters, call/define.   | More advanced the programming techniques listed using Python and GUI IDLE. How to create a text based quiz/game using all python techniques learnt. <b>(LIT/NUM)</b>   |
| Binary Data            | Binary, base 2, denary, binary addition, overflow error, Data representation, digital sound, Boolean Logic, and/or/not gates logic circuit.                                       | How to convert between binary and denary numbers and binary addition. Creating bitmap images and converting audio sound to digital recordings. Creating logic gate circuits <b>(NUM)</b>                                   |
| Computational Thinking | Abstraction, decomposition, searching & sorting algorithms. Binary search, linear search, merge sort, bubble sort, insertion sort, bucket sort. Flowcharts                        | Explain how real word problems are tackled by computers such as searching and sorting algorithms. How algorithms can be show as a flowchart. circuits <b>(NUM)</b>   |

**Development homework**

Pupils will sign up to the **iDEA award**. An online platform that allows pupils to complete mini courses and achieve digital badges for improving their digital skills. Specific badges will be pointed to that relate to current classwork but pupils can also complete badges at their own speed. Enough badges can earn the pupils a bronze award and with enough they can achieve the silver award.

<https://idea.org.uk/>

