KS3 Curriculum Intent for Computer Science at Blessed Robert Sutton Catholic Voluntary Academy

	Overall Aim of Subject **By studying Computer Science at Blessed Robert Sutton, all pupils from Year 7 to Year 11 will gain a coherent knowledge and understanding of the development of how technology works and explore programming solutions to broaden individuals to possible career opportunities that Computer Science can offer, this will be explored using the Robert Sutton Way.**
	Computer Science will teach **spiritual development** by pupils being confronted with moral, ethical and legal dilemmas faced in the context of technology. Teaching will encourage pupils to develop an understanding by researching and exploring a number of key scenarios on the spirituality of how humans should use technology, but discuss how it can be used by certain individuals or organisations.
	Computer Science will teach **social excellence** through a range of teaching strategies that allow opportunities for pupils to work effectively as a community. Class discussions will develop pupils' abilities to work effectively as a team; paired work allows pupils to develop understanding and embed concepts and ideas. Areas of focus are: communicating, respecting, listening and developing each other's ideas.
	Computer Science will teach **academic excellence** by developing an understanding of the academic rigours of studying Computer Science. Pupils will develop an understanding and appreciation of focus into how all technology is designed, focusing on areas such as hardware, software, networking and the core concept of developing pupils' knowledge and competence in programming. Pupils will use the systems development lifecycle to analyse, design, test and evaluate programs they produce. Pupils will also explore methods of answering different types of exam questions to allow them to succeed.

Enrichment opportunities in this subject include:
For example,
- **Curriculum Challenges**
- **Programming Projects**
- **Computer Science Intervention Sessions**

Key Stage 3 Course description

Pupils will follow the Key Stage 3 National Curriculum considering further study at Key Stage 4 with the OCR GCSE Computer Science. As a result, the Computer Science Curriculum aims to enable pupils to:

- Develop and enhance their ICT skills using a range different pieces of software

- 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

Year 7

In Year 7 pupils key enquiry shall be: to understand how to use the computer, ensure all basics are replicated – such as: typing skills, using folders, naming conventions, using basics of Office software to complete certain tasks. The units they will explore are:

- **Using computers safely unit –** this will focus on areas such as Health and Safety in the classroom, Folders and Saving and E-Safety (Social Media and Cyberbullying.
- **Input, output and memory unit -** During this term, students will look at how computers work, including hardware and software, input and output devices, and memory. They will also look at how computers process information and instructions.
- **Using media to gain support for a cause unit –** During this unit, learners develop their understanding of information technology and digital literacy skills. They will use the skills learnt across the unit to create a blog post about a real-world cause that they would like to gain support for. Learners will develop software formatting skills and explore concerns surrounding the use of other people's work, including licensing and legal issues.
- **Scratch (Block code programming) unit**- this will allow pupils to focus on different scenarios and allow them to develop block code and create running programs. They will explore subject terminology such as: variables, inputs, outputs, if statements and loops.
- **Modelling data using spreadsheets unit –** this unit takes learners from having very little knowledge of spreadsheets to being able to confidently model data with a spreadsheet. The unit uses engaging activities to progress learners from using basic formulas to writing their own COUNTIF statements. This unit will give learners a good set of skills that they can use in computing lessons and in other subject areas.

Year 8

In Year 8 pupils' key enquiry shall be: 'the further development of programming – textual language Python''

- **Computer Networks unit –** pupils will focus on how technology is networked and discover the basics of LAN and WAN, using the internet and the basics of packet switching.
- **Computational thinking unit –** During this term, students will look at how computers work, including hardware and software, input and output devices, and memory. They will also look at how computers process information and instructions.
- **Media – vector graphics unit** - This unit offers learners the opportunity to design graphics using vector graphic editing software. By the end of the unit learners will have produced an illustration, a logo, or some icons using vector graphics.
- **Layers of computing systems** - This unit takes learners on a tour through the different layers of computing systems: from programs and the operating system, to the physical components that store and execute these programs, to the fundamental binary building blocks that these components consist of.
- **Introduction to Python –** pupils will explore a new textual language, this will be used for projects in GCSE. Pupils will see the difference between block code programming to textual language and focus on variables, inputs, outputs, data types and if statements.
- **Mobile app development unit -** In a world where there's an app for every possible need, this unit aims to take the learners from designer to project manager to developer in order to create their own mobile app. Using App Lab from code.org, learners will familiarise themselves with the coding environment and have an opportunity to build on the programming concepts they used in previous units before undertaking their project.

Year 9

In Year 9 pupils' key enquiry shall be: 'Expanding their knowledge further of programming terminology – to enable access into GCSE'

- **Data representation – Boolean logic and processing -** During this term, students look at Boolean Logic and Processing. They construct truth tables for logic gates, look further into the fetch-decode-execute cycle, and explore how computers are able to translate high-level code (Python) into machine code (binary).

- **Animation -** this unit aims to take the learners from designer to project manager to developer in order to create their own animations.
- **Data Science –** In this unit, learners will be introduced to data science, and by the end of the unit they will be empowered by knowing how to use data to investigate problems and make changes to the world around them. Learners will be exposed to both global and local data sets and gain an understanding of how visualising data can help with the process of identifying patterns and trends. Towards the end of the unit, the learners will go through the steps of the investigative cycle to try to solve a problem in the school using data.
- **Cyber security -** This unit takes the learners on an eye-opening journey of discovery about techniques used by cybercriminals to steal data, disrupt systems, and infiltrate networks. The learners will start by considering the value of their data to organisations and what they might use it for. They will then look at social engineering techniques used by cybercriminals to try to trick users into giving away their personal data. The unit will look at the more common cybercrimes such as hacking, DDoS attacks, and malware, as well as looking at methods to protect ourselves and our networks against these attacks.
- **Physical computing -** This unit applies and enhances the learners' programming skills in a new engaging context: physical computing, using the BBC micro:bit. In the first half of the unit, learners will get acquainted with the host of components built into the micro:bit, and write simple programs that use these components to interact with the physical world. In the process, they will refresh their Python programming skills and encounter a range of programming patterns that arise frequently in physical computing applications. In the second half, learners will work in pairs to build a physical computing project. They will be required to select and design their project purposefully, apply what they have learnt by building a prototype, and keep a structured diary throughout the process.
- **Advanced Python Programming –** This unit introduces learners to how data can be represented and processed in sequences, such as lists and strings. The lessons cover a spectrum of operations on sequences of data, that range from accessing an individual element to manipulating the entire sequence. Great care has been taken so that the selection of problems used in the programming tasks are realistic and engaging: learners will process solar system planets, book texts, capital cities, leaked passwords, word dictionaries, ECG data, and more.

Assessments

In KS3 Computer Science pupils will be assessed formatively using a range of peer and self-assessment, as well as through marking and feedback in the form of clear targets and questioning by teachers to ensure consistent progression.

Summative assessment practices at KS3 ensure that there is clear line of progression from KS3 to KS4 the new 1-9 GCSE Grading System. All year groups will be completing a minimum of two SPC's to show knowledge over time as well as end of unit assessments to test knowledge further. The style of assessment depends on the unit for instance some will be practical on the computer assessments, however a main focus will be on exam technique and written questions to aid in supporting KS4.

Ways to help my child succeed
To support your child speak to them about the topics they are studying in school and encourage them to read around the topic outside of school. There are a range of excellent websites, books and documentaries that will assist with this. Please don't hesitate to contact the department for further ideas.
- Be positive about the benefits of Computer Science
- Help identify uses and roles in industry where Computer Science is used. E.g. Architecture, Engineering, Finance, Art.
- Remind them that Computer Science is designed to make life easier for people and some skills are not as difficult as they may seem.
- Encourage students to complete homework.
- Use websites such as Code Academy to follow coding courses of their choice.
- Encouraging e-safety and the appropriate use of Computer Science
- www.thinkuknow.co.uk/
- www.stopcyberbullying.org/index2.php
- Encourage them to find out about the latest technology on the Internet.
- www.wired.com/
- http://fwd.five.tv/gadget-show
- www.technologyreview.com/
- www.bbc.co.uk/learning/subjects/information_technology.shtm