# 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.
•	<b>Computer Science</b> will teach <b>spiritual development</b> 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.
	<b>Computer Science</b> will teach <b>social excellence</b> 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.
	<b>Computer Science</b> will teach <b>academic excellence</b> 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 auestions 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:

• Clear messaging in digital media – This unit is designed to build upon learners' experience in key stage 2. It requires learners to use a range of different skills across several pieces of software. Learners will work between different applications to create a poster and slides on a given theme. The unit is designed so that learners can concentrate on applying skills that they may have previously learnt as well as those learnt in the unit.



• Networks from semaphores to the internet - This unit begins by defining a network and addressing the benefits of networking, before covering how data is transmitted across networks using protocols. The types of hardware required are explained, as is wired and wireless data transmission. Learners will develop an understanding of the terms 'internet' and 'World Wide Web', and of the key services and protocols used. Practical exercises are included throughout to help strengthen understanding.



- **Programming Essentials Scratch Programming 1** This unit is the first programming unit of KS3. The aim of this unit and the following unit ('programming 2') is to build learners' confidence and knowledge of the key programming constructs. Importantly, this unit does not assume any previous programming experience, but it does offer learners the opportunity to expand on their knowledge throughout the unit.
- **Modelling Data Using Spreadsheets –** 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.



- **Programming Essentials Scratch Programming 2 –** This unit begins right where 'Programming I' left off. Learners will build on their understanding of the control structures' sequence, selection, and iteration (the big three), and develop their problem-solving skills. Learners will learn how to create their own subroutines, develop their understanding of decomposition, learn how to create and use lists, and build upon their problem-solving skills by working through a larger project at the end of the unit.
- Using Media Gaining Support for a Cause 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.



## Year 8

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

• 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.



- Media Vector Graphics 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.
- **Computational Thinking** in this unit learners 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.



- Developing for the web In this unit, learners will explore the technologies that make up the internet and World Wide Web. Starting with an exploration of the building blocks of the World Wide Web, HTML, and CSS, learners will investigate how websites are catalogued and organised for effective retrieval using search engines
- Introduction to python programming This unit introduces learners to text-based programming with Python. The lessons form a journey that starts with simple programs involving input and output, and gradually moves on through arithmetic operations, randomness, selection, and iteration. Emphasis is placed on tackling common misconceptions and elucidating the mechanics of program execution.
- **Representations from clay to silicon -** This unit conveys essential knowledge relating to binary representations. The activities gradually introduce learners to binary digits and how they can be used to represent text and numbers. The concepts are linked to practical applications and problems that the learners are familiar with.



### Year 9

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

• Intro to 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.



• Animation – In this unit learners will discover how professionals create 3D animations using the industrystandard software package, Blender. By completing this unit learners will gain a greater understanding of how this important creative field is used to make the media products that we consume.



• 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.



• **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.



• **Mobile App development –** 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.



• **Representations: going visual** - In this unit, learners will focus on digital media such as images and sounds, and discover the binary digits that lie beneath these types of media.

### 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