KS3 Curriculum

Computer Science

CURRICULUM INTENT?

What does Computer Science do to help young people achieve at KS3? Why have you made these curriculum choices?

Our KS3 Curriculum is designed to be rich in knowledge across a wide range of topics, ensuring that we not only fulfil the National Curriculum but also look to extend students' knowledge and develop skills that will equip them for further study at KS4 and importantly for when they leave school and move on to the wider world of work.

We want our students to understand and play an active role in the digital world that surrounds them, not to be passive consumers of technology. A sound understanding of computing concepts within our curriculum will help them see how to get the best from the systems they use, and how to solve problems when things go wrong.

The Computer Science area of the curriculum focuses on allowing students to:

- Learn how to stay safe online and apply the principles of good computer etiquette and file management to other curriculum areas.
- Use block and text-based programming software to engage the students in computational thinking and problem solving.
- Show how modelling using spreadsheet software can more effectively solve labour intensive mathematical and organisational problems.
- Think computationally, innovatively, analytically, logically, and critically.
- Understand the Cyber Security threats and how to negate them.
- Understand the components that make up digital systems, and how they communicate with one another and with other systems.
- Understand the impacts of digital technology to the individual and to society in general.
- Apply mathematical skills relevant to Computer Science and wherever possible link the exercises to real world scenarios.
- Learn how digital graphics are created and how to manipulate them.
- Learn how web pages are created and indexed.

TERM BY TERM BREAKDOWN – Knowledge acquired, and skills developed:				
	Year 7 Course Outline	**Year 8 Course Outline**	**Year 9 Course Outline**	**Opportunities beyond the classroom**

Autumn Term	*Knowledge:* ***Digital Citizenship*** *Key Skills:* • *Using passwords effectively.* • *File management.* • *Health and safety using IT equipment.* • *How to use email systems with an emphasis on email etiquette.* • *The dangers of Cyberbullying and online grooming and how to minimise the risks.*	*Knowledge:* ***Online Safety* - understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns** *Key Skills:* • Digital Footprint • Online Reputation • Fake News • Data Theft • Privacy • Revenge attacks *Knowledge:* ***Understanding Computers*** *Key Skills:* • *Understand what is meant by a 'computer system'.* • *Learn the main components of a computer.* • *Name and recognise the main input and output devices and what senses they engage.* • *The CPU – Learn how the central processing unit works.* • *Understanding how binary code works and why computers use it.* • *Binary addition – adding numbers in binary.* • *Storage devices* • *Convergence and new technologies*	*Knowledge:* ***Online Safety* - understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns** *Key Skills:* • Digital Footprint • Online Reputation • Fake News • Data Theft • Privacy • Revenge attacks *Knowledge:* ***Computing Fundamentals*** *Key Skills:* • *Learn how the different elements work cohesively and the different uses for each type of storage along with the components of the CPU and the advantages of the Von Neumann Architecture, building and refining on the core knowledge from the Understanding Computers work in Year 8.* • *List and explain the advantages and disadvantages of different network topologies and recognise these from diagrams.*	Students can sign up for codeacademy: https://www.codecademy.com/learn/learn-python-3 Students are encouraged to stay up to date in the subject by reading technology journals, magazines and websites.

			• *Understand the purposes of WANs, with particular focus on the internet.* • *Compare and contrast Client server and Peer to Peer networks.* • *Understand forms of attack and threats posed to a network.*	
Spring Term	*Knowledge:* ***Programming With Small Basic*** *Key Skills:* • *Turtle Commands.* • *Using a For Loop.* • *Programming the Text Window.* • *Using Variables.* • *Conditions and Branching.* • *Using the random numbers within a program.*	*Knowledge:* ***Programming with Python*** *Key Skills:* • *Understanding the uses of Python as a high-level programming language.* • *Understand how Python handles String and Variables.* • *Using numbers and arithmetic within programming code.* • *Understanding how to use and apply Selection.* • *Be able to write Algorithms.* • *Using and interpreting While Loops within code.* • *Understand methods Searching and being able to pick out the most effective method.* • *Be able to carry out testing and debugging on programs effectively.*	*Knowledge:* ***Logical Thinking*** *Key Skills:* • *Problem solving with computational thinking.* • *Develop algorithms using flow diagrams.* • *Recognising logic diagrams and creating truth tables* • *Learn how to complete binary arithmetic and hexadecimal calculations and conversions.*	Free comic strip creation software: https://www.storyboardthat.com and http://www.pixton.com Software to create characters that can then be exported to comic creation software or used on their own: https://charactercreator.org/ and image editing software http://photopea.org

Summer Term	*Knowledge:* ***Spreadsheets*** *Key Skills:* • *Understand basic spreadsheet - Cell referencing, Basic formulas and functions.* • *Appreciate how computer modelling helps to make and influence predictions.* • *Create financial models for a given scenario using appropriate calculations.* • *Use 'What IF' Scenarios to engage in decision making.* • *Applying conditional formatting and validation.* • *Creating Macros for increased functionality.* • *Producing Charts to display information in a more visual format.* ***Students will learn about Computer Crime and Cyber Security if there is time left at the end of term.***	*Knowledge:* ***HTML*** *Key Skills:* • *HTML Tags.* • *HTML Structure.* • *CSS* • *Design and Layout* • *Searching the Web* • *Tightening the Web.* • *Navigating the Web* ***Students will study 'living in a Digital World pt 1' if there is time at the end of the term.***	*Knowledge:* ***Advanced Python Programming*** *Key Skills:* • *Revisiting skills learnt in year 8 such as variables and constructs such as iteration (loops) and selection (if statements).* • *Using lists.* • *Reading from a file.* • *Writing to a file.* • *Creating programs to solve problems.* *(Time Permitting) Knowledge:* ***Living in a Digital World pt.2*** *Key Skills:* • *Revisiting skills learnt in living in a digital work part 1 and expanding knowledge* • *Understanding Data Science* • *Global Data* • *Statistics* • *Cyber Security*	Code with python online with no need to install it locally: https://repl.it/languages/python3 Attempt gradually more difficult tasks to increase coding skills. https://snakify.org/teacher/ A coding club is planned to start when the year 11 exam revision sessions are complete.

Key Independent Learning Resources	**GREAT READS**
The PowerPoint presentations for all lessons are available to students by using their Schoology accounts. Computer Science for Fun: BBC Bitesize https://www.bbc.com/bitesize/subjects/zvc9q6f	**Coding for Beginners: Using Python** ISBN-10: 9781409599340 ISBN-13: 978-1409599340 ASIN: 1409599345

	My Revision Notes: OCR Cambridge Nationals in Creative iMedia L 1 / 2: Pre-production skills and Creating digital graphics Paperback: 88 pages Publisher: Hodder Education (31 Mar. 2017) Language: English ISBN-10: 1471886689 ISBN-13: 978-1471886683