



Our Lady's Catholic College

Key Stage 3 Computer Science Curriculum Overview

Our Lady's Catholic College, Morecambe Road, Lancaster, La12rx

Year 7	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Unit	7.1 Intro to Computing		7.2 Computing Concepts		7.3 Computer Networking and Cybercrime	
Big Question	How do I use a computer?		What is a computer system?		How does the internet operate?	
Rationale of sequencing	This unit covers the necessary basic knowledge to use computers safely, effectively and responsibly. This unit will prepare students for using ICT throughout their time at Our Lady's. Pupils begin by looking at file management and security. The unit then moves on to online safety and online profiles to give pupils a better understanding and awareness of using social media. The functionality and operation of email and search engines and how to use them effectively are also covered.		This unit introduces students to fundamental Computing theory. It focusses on what a computer system is. Students will be able to identify a computer system via the input, process, output and storage. The students will also be introduced to key computing concepts including algorithms, decomposition, abstraction and sequencing. They will experience some basic graphical programming using Scratch to start developing their programming knowledge and embed computing concepts. This unit will provide students with the foundation programming knowledge in preparation for 8.1 Programming Basics and 9.3 Python as well as knowledge of computing concepts which will be explored further in 8.2 Digital Literacy and 9.1 Graphics.		This unit provides students with an understanding of how networks and the internet works. It also explores network security and cybercrime and ensure students are aware of how to protect themselves online. This unit builds on issues of privacy and security introduced in Unit 7.1Intro to Computing, giving students a greater understanding of how their data is transmitted and developing the concepts of how and why security needs to be in place. It will prepare students for future studies in 8.3 Computer Systems and 9.3 Digital World where they will continue to develop their understanding of security risks when using technology and how to remain safe online.	
Links to prior learning	Aim to gather a background understanding of ICT skill set KS2 curriculum – use technology safely, respectfully and responsibly. Use of searching technologies.		Aim to gather a background understanding of Computing skill set KS2 curriculum – algorithms, sequencing and selection, basic programming		7.1 Intro to Computing – concepts of communicating electronically. KS2 curriculum – understanding of basic networks	
Misconceptions	All information on the internet is trustworthy and reliable		Computers think like human rather than logical machines. Confusing input and output devices e.g. thinking a touchscreen is only an output device, not both input <i>and</i> output.		Using the term Wi-Fi to mean any internet connection. Confusion between a web browser and a search engine.	
Links to national curriculum	Understand a range of ways to use technology safely, respectfully, responsibly and securely		- understand several key algorithms that reflect computational thinking - use two or more programming languages		Understand the hardware and software components that make up computer systems	

Links to curriculum intent	Know: • Why passwords are used and what makes a secure password. • What the directory folder is? • The dangers of social media sites. • Strategies used to communicate electronically. • The dangers associated with phishing. • What a search engine is. • The importance of reliable and accurate information online. Know How: • Create a secure, memorable password. • Create relevant folders for each subject. • Explain how to keep their identify safe online. • Explain how to respond to threats online. • Be able to send a well-structured email using relevant software features. • Discuss how to avoid being a victim of an email scam. • Explain how to use a search engine efficiently. • Evaluate the reliability and accuracy of information online.	Know: • What a computer system is. • The input, process, output and storage components of a computer system. • What decomposition is used for? • What abstraction is used for? • What algorithms are used for? • What sequencing is used for? • The strategies used to create a sequencing program. Know how: • Analyse computer systems and identify input, process, output and storage. • Analyse real life problems and use decomposition to break down into management chunks. • Analyse real life problems and use abstraction to highlight areas of importance. • Create algorithms for real life problems. • Apply programming skills to create simple programs using inputs, outputs, processing and sequencing.	Know: • What a network is? • What network hardware is needed? • The process of wired and wireless data transmission? • What data packets are and how they are used to transmit data. • What various ICT threats are (shouldering, name generator attacks, phishing, and blagging, DOS, DDOS attacks). • What malware is and how to protect against it. • The difference between ethical and unethical hacking. Know How: • Explain how networks are used? • Explain how wired and wireless data is transmitted. • Be able to identify different network hardware required for different types of network. • Explain how data packets are broken down and sent across a network. • Identify threats to a computer system (shouldering, name generator attacks, phishing, and blagging, DOS, DDOS attacks) • Discuss the impact that malware has. • Evaluate internet protection methods. • Explain the difference between ethical and unethical hacking.
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Year 8	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Unit	8.2 Introduction to Programming		8.2 Digital Literacy		8.3 Computer Systems	
Big Question	How can I solve real life problems with programming solutions?		How can I solve real life problems with ICT software?		How does a computer work?	
Rationale of sequencing	This unit continues to develop programming skills introduced in 7.2 Computing Concepts by using Edublocks. This software is a stepping stone between block-based and text-based programming, preparing students for 9.3 Python Programming. Students will strengthen fundamental programming concepts; inputs and outputs, sequencing, selection and iteration all of which are vital for our GCSE Computer Science students.		This unit aims to utilise key computing concepts taught during 7.2 Computing Concepts (decomposition and abstraction) and apply them to real life problems. It also expands upon their use of technology which was introduced in 7.1 Intro to Computing. They will develop skills using a wide range of software developing their confidence of using application software for use in their future and for students studying ICT at KS4.		This unit aims to provide students with a detailed understanding of the inner workings of a computer. This builds upon 7.3 Computing Networking and Cybercrime by looking in more depth at how a computer handles data using binary, as well as how characters, sound and graphics are interpreted by a Computer. This supports students with a background understanding of storage of graphics in preparation for 9.1 Graphics as well as fundamental concepts for GCSE Computer Science.	
Links to prior learning	7.2 Computing Concepts – introduction to computing concepts and basic programming		7.1 Intro to Computing – using ICT to organise, search and save 7.2 Computing Concepts – problem solving using decomposition and abstraction		7.3 – Computer Networking and Cybersecurity - students have established what a network is and how that is used to transfer data	
Misconceptions	Assumption that computer programs have common sense and will correct problems within computer programs or complete missing detail.		Breaking a task down into unmanageable chunks. Understanding of relevant and irrelevant content when analysing a problem.		Understanding of place values. Confusing binary place values with denary.	
Links to national curriculum	- Understand several key algorithms that reflect computational thinking - Use two or more programming languages		- undertake creative projects that involve selecting, using, and combining multiple applications - understand a range of ways to use technology safely, respectfully, responsibly and securely		- understand simple Boolean logic - understand the hardware and software components that make up computer systems - understand how instructions are stored and executed within a computer system	
	Know: - The difference between input and output. - The process of writing algorithms.		Know: - What data is? - What information is?		Know: - How data is stored on a computer? - What is binary? - What is binary addition?	

Links to curriculum intent	• What sequencing is? • What selection is? • What is iteration? • Incorporating sequencing, selection and iteration into an algorithm and computer program. • What is a variable? • Strategies used to decompose and solve real life problems Know how: • Write a program that will input/output data. • Write a program that will input data, process it (calculation) and output data. • Write a program that uses sequencing • Write a program that uses selection with two outcomes (IF-ELSE). • Write a program that uses selection with more than two outcomes (IF – ELIF-ELSE). • Write a program that uses iteration. • Write a program that used variables and has the ability to randomise. • Solve a real life problem using a range of programming techniques.	• Strategies used to analyse a problem and identify solutions • What software should be used for certain tasks • Identify methods of modelling data? • Instructions used to query a database • Instructions to format a word document • Evaluating the effectiveness of ICT solutions Know how: • Explain the difference between data and information • Analyse problems and suggest relevant, appropriate solutions using suitable software • Apply formatting tools effectively and confidently within a variety of software • Construct formulae and functions to perform calculations within a spreadsheet • Perform relevant sorting and filtering within spreadsheet and database software • Effectively search for information.	• The process used to store an image electronically? • What bit depth is? • The process used to store characters electronically? • The process used to store sound electronically. Know how: • Explain how data is stored on a computer • Perform binary to denary conversions • Perform denary to binary conversions • Discuss binary addition rules • Perform binary addition calculations • Display bitmap images in a binary format • Explain how the quality of an image impacts the file size • Explain how characters are presented in binary • Explain how sound is represented in binary
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Year 9	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Unit	9.1 Graphics		9.2 Python Programming		9.3 Digital World	
Big Question	How can we create digital graphics for a purpose?		How can I write code like a Computer Scientist?		What is AI and how can we ensure it is being used safely and effectively?	
Rationale of sequencing	Following on from 8.2 Digital Literacy, students develop a deeper understanding of using technology to solve real world problems through the use of graphics. Students will develop a better understanding of the processes involved in creating vector graphics and will be provided with the knowledge and tools to create their own. They will also embed knowledge of saving images introduced during 8.3 Computer Systems. Digital imaging skills are required for students studying ICT at KS4.		Following on from 8.1 Introduction to Programming, students build on block programming and are introduced to text-based programming. The lessons start with simple programs involving input, output and sequencing and gradually move through arithmetic operations, selection, and iteration. The students will complete paired programming, live coding and worked examples. This unit will prepare students for the programming elements of the GCSE Computer Science course.		This unit explores the fundamentals of AI including machine learning, large language models and generative AI. Following on from 7.1 Intro to Computing and 7.3 Computer Networking and Cyber Security where students were introduced to e-safety and security concepts, this unit looks into AI with an aim to ensure students are aware of what AI is, what the threats and associated risks are and how to ensure ethical and responsible use? This will prepare students for their use of technology in future.	
Links to prior learning	8.2 Digital Literacy – utilising software to solve real life problems 8.3 Computer Systems – saving digital images in binary		8.1 Introduction to Programming (block-based programming)		7.1 Intro to Computing – e-safety concepts 7.3 Computer networking and cybersecurity – security issues presented online	
Misconceptions	Confusion between bit depth and resolution.		Confusion between = (assignment) and ==. Not being explicit when combining Boolean expressions (e.g. if guess == 1 or 2 instead of if guess == 1 or guess == 2)		Everything produced by AI is accurate, trustworthy and reliable.	
Links to national curriculum	- undertake creative projects - create, reuse, revise, and repurpose digital artefacts for a given audience,		Use two or more programming languages		- understand a range of ways to use technology safely, respectfully, responsibly and securely - design, use and evaluate computational abstractions	
Links to curriculum intent	Know: What a vector image is.		Know: The difference between algorithms and programs.		Know: - What is AI? - What is machine learning?	

	• Where would the use of vector images be appropriate? • The difference between bitmap and vector images. • The difference in behaviour between bitmap and vector images when scaled. • What tools and features can be used to produce vector graphics? • Tools and techniques available to complete solutions to real world problems. • The process followed to save and export images successfully. • What file size is an image saved in and what the impact of that is? • Evaluating a graphical image. Know How: • Discuss that a vector image is and where vector images should be used. • Discuss the differences between bitmap and vector images. • Create suitable vector graphic solutions for real world problems using a range of appropriate tools and techniques. • Export images to suitable file types. • Be able to review and improve vector graphics based on feedback and personal evaluation.	• That a program written in a programming language needs to be translated in order to be executed by a machine. • The process of identifying and correcting syntax errors. • What relational operators are? • The difference between IF, ELIF and ELSE statements. • What is iteration and how does it control the flow of program execution? • What is a variable and how can it be used to create efficiency in programs? Know How: • Explain the difference between algorithms and programs. • Explain how a machine translates programs to be executed. • Write simple Python programs including input and output and storage into variables. • Problem solve Python programs to identify and solve errors. • Use simple arithmetic expressions in assignments statements to calculate values. • Receive input from the keyboard and convert it to a numerical value. • Create programs using binary selection (IF and ELSE statements). • Use variables as counters in iterative programs.	• What is generative AI? • What are large language models? • The benefits and disadvantages of AI. • Explain the ethical landscape of AI. • If AI can be used safely ensuring privacy for users? • If the synergy between robots and AI assist future technological development? Know how: • Explain what AI is and discuss relevant potential uses. • Explain what machine learning is and how it works. • Explain what generative AI is and how it works. • Explain large language models are and how they work. • Discuss the benefits and disadvantages of AI. • Debate the ethical issues that can arise using AI. • Review privacy considerations for users of AI? Identify measures to be taken to ensure users are safeguarding? Discuss whether these measures are good enough? • Discuss and make predictions about the future of technology
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