Topic Sequencing and Rationale

The KS3 curriculum has been designed to ensure learners have sufficient knowledge to stay safe online and use a range of computing devices and applications effectively. The curriculum has been designed to develop skills which promote problem solving skills, resilience, and links to real world issues

Key Stage 3

	Year	What is taught? Overview of Topics	Why this? Why then?
KS3	**7**	**HT1. Using the Computer Effectively, Pure ICT skills (file management, typing skills, learning how to email, create a letter and presentation)**	First topic – students start Rossett with a mix level of ability within ICT, most students are familiar with using iPad not computers. This topic teaches students to become familiar with using a computer, school network, setting up a correct file structure, saving their work and using Microsoft office packages to present their work and general ICT skills. The core skills provide the foundation for the rest of the years' work within ICT and cross curricular subjects. Being able to use Microsoft Office software is still viewed by most employers as an essential set of skills.
		HT2: Scratch	Students are required to be able to program in 2 different languages, Scratch is a programming language that allows the students to develop the core constructs of programming within a drag and drop format and a visual representation. Most students will have been taught Scratch a primary school so with be familiar with some concepts – this topic is about building on their existing knowledge to enhance their level of understanding with the programming constructs. Taught in HT2 so students can still remember what they have been taught at primary school and preparing them for data types and data structures for up-and-coming topics.
		HT3: Graphics/Photoshop editing	Students are taught photoshop during HT3, mainly because the previous topics are quite difficult and not as fun as editing photos. The graphics module builds upon the skills taught in the previous half term and allows them to learn about the creative side of ICT. Students will have previously learnt how to design a project for a target audience, they will then be able to build upon this knowledge.
		HT4: Introduction to spreadsheets	Students are introduced to spreadsheet within HT4, being able to use excel is a key skill that is required in majority of jobs, students are taught what a spreadsheet is, formatting and basic formulas. The spreadsheet builds upon skills taught in scratch such as understanding what a variable is and functions. Students will also be able to analyse data and produce a chart to interpret numerical data.

		HT5: Data Representation	Once the students understand how data is stored within a computer in terms of memory and storage, students need to then understand how the computer can process different types of data and understand the computers language of binary.
		HT6: E-safety	This topic is taught last within Year 7 because students have to have an awareness of using the computer properly before really understanding e-safety. The students will have been taught how to use the internet correctly and difference between valid and biased opinions making it easier for them to understand the potential threats and dangers that computers can bring. The rational in having this as the last topic in year 7 is because as students start to transition into teenagers, they become more confident with using social media applications and the internet, it's important that before they leave for summer students are fully aware of the dangers of being online.
	8	**HT1: Understanding Computers**	This is the first topic of Year 8, students must be familiar with hardware devices and understand the fundamentals of a computer system, in terms of Input-Processing and Output. Once the students are familiar with the role of the CPU and the computers language, they then can apply this knowledge to any other computer system device and understand that microwaves and washing machines are a type of Computer System. Students will also learn about the factors that affect the performance of the CPU and begin to understand what clock speed, RAM, number of cores are to help them understand a computer specification. Students will also be taught about software, its important that students are able to select the correct application to complete a given task, students must be familiar with the core concepts of software and be able to use certain applications such as Microsoft Office which is an industry standard.
		HT2: Networks	The students will be familiar with basics of computer systems and will understand how they can use them to communicate. Students will already know how to use a network however they will not understand the concept and infrastructure around a computer network. Student will be taught what a computer network are the differences between Wired and Wireless Network and how the world revolves around computer network such as the Internet. Students will use a network in whatever career path they take, it's important for the students to realise the potential threats and what's deemed to be an acceptable use of a network, after all students do sign on in Year 7.
		HT3: Comic Strip	This unit builds on the graphics module builds upon the skills taught in the previous half term and allows them to learn about the creative side of ICT. Students will have previously learnt how to design a project for a target audience, they will then be able to build upon this knowledge.

		HT4: Audacity	Students learn how to record, share and edit audio. In this unit students will learn how sound is digitized and stored on computers. They will learn the basic sound editing techniques and how to add sound effects and mix tracks. Students will undertake a creative project to analyse, plan, record and edit a short sound file. This could take the form of a radio advisement for a given scenario or a short podcast.
		HT5: Introduction to Python	This builds upon the knowledge the students have previously been taught in Scratch, they get to apply the core programming constructs and demonstrate their programming skills within a text-based programming language. The students will also be taught the skill of algorithmic thinking, this allows the students to be creative and develop their problem-solving skills which is a key life skill. Computer programming promotes logic thinking, learning to code helps the students creatively, learning to code helps develop perseverance and resilience. They learn how to build something large by smaller pieces coming together, which helps them to see the bigger picture.
		HT6: My Digital World	This topic is taught last within Year 8. The rational in having this as the last topic in year 8 is because as students start to transition into teenagers, they become more confident with using social media applications and the internet, it's important that before they leave for summer students are fully aware of the dangers of being online.
	9	**Ft 1: ICT Theatre project Skills**	Being able to use Microsoft Office software is still viewed by most employers as an essential set of skills. Students get the chance to use Microsoft Outlook, Excel, PowerPoint. Publisher and Word in a project which is themed around the organisation and production of a school play. They will become confident in the use of formatting, inserting objects, spreadsheet formulas and data analysis, letter composition, mail merge and many other skills. Not only will this make them more productive going forward but should help them stand out from the crowd in the marketplace for jobs.
		HT3: HTML, CSS and JavaScript	This unit builds upon the skills taught in Year 7 and 8 including programming skills and graphics. Students will learn how to create a basic website using HTML, they will understand Tags and basic HTML operations. Students will then learn how to use CSS to create a consistent design for a target audience and include JavaScript in order to make their website interactive,
		HT4: Web graphics and HTML	All business have a website, knowing how to create a website and edit existing websites is valuable skill. Students will build upon the knowledge they were taught in Year 7 as they will need to be able to edit and resize images using a graphics package. This allows the students to be creative and understand how a good website can make or break a website.

		FT2: I Media – Graphics, Target Audience	This unit will enable learners to understand the basics of comic strip creation. It will enable them to interpret a client brief, use planning and preparation techniques and to create their own comic strip using digital techniques. On completion of this unit, learners will be able to explore different genres of comic strip and how they are created, plan and create a comic strip to specific requirements, and review the final comic against a specific brief.
		FT3: AL and Machine Learning	There is growing evidence that computational thinking skills are becoming just as important in other disciplines, such as the Arts and Sciences, as in a computer classroom. Being able to solve problems with computers is rapidly becoming a requirement in more fields and jobs. Computers and therefore computational thinking have been used to solve many problems in Engineering, Design, Science, Medicine, Finance, Banking, Government, and many other fields. Artificial Intelligence already plays an important role in people's lives. This might be Netflix or Siri, a phone camera's facial recognition, a machine that can spot tumours, self-driving cars, washing machines that detect the weight of the load, chatbots for the lonely or a program that scans thousands of legal documents in minutes for errors. The future role of AI is fascinating and morally interesting as devices that can genuinely "learn" and make new decisions become more commonplace, thus students need to know the potential of this technology.

Key Stage 4

IMedia:

Topic Sequencing and Rationale

	Year	What is taught? Overview of Topics	Why this? Why then?
KS4	**10**	**R081: Pre-production Skills** **R084: Storytelling with a comic strip**	This unit it taught first as it provides the students with a foundation knowledge of pre-production documents and processes to allow them to successfully undertake the internally assessed units. It is important to teach this unit first as the students take an external examination in January. This unit is taught second as the creation of the product requires very little specialist subject knowledge. This gives the students time to focus on understanding the planning and preparation tasks that are a recurrent theme throughout the internally assessed units.
	11	**R088: Creating a digital sound sequence** **R082: Creating digital graphics**	This unit is taught third as even though the creation of the product requires specialist knowledge, the portfolio of evidence is much lighter than in R082. This unit also provides a good insight into how the evidence of skills in specialist software should be presented. This unit is taught last as the preparatory work, in terms of new skills, is quite in depth. Pupils are required to develop skills in Adobe Photoshop before attempting the assessment. More time can be given to this element as pupils are more proficient in the planning and preparation aspects of the unit, due to their exposure to it in prior units.

Key Stage 4

Cambridge Nationals Information Technologies:

Topic Sequencing and Rationale

This qualification is about applying understanding and skills to use technologies to select data, manipulate, store, analyse and present it as information, and follow a project life cycle to structure how it's done. There are eight learning outcomes.

- Learning Outcome 1: Understand the tools and techniques that can be used to initiate and plan solutions
- Learning Outcome 2: To be able to initiate and plan a solution to meet an identified need
- Learning Outcome 3: Understand how data and information can be collected, stored and used
- Learning Outcome 4: Understand the factors to be considered when collecting and processing data and storing data/information
- Learning Outcome 5: To be able to import and manipulate data to develop a solution to meet an identified need
- Learning Outcome 6: Understand the different methods of processing data and presenting information
- Learning Outcome 7: To be able to select and present information in the development of the solution to meet an identified need
- Learning Outcome 8: To be able to iteratively review and evaluate the development of the solution

- Key Stage 4 Cambridge Nationals Information Technologies: At KS4 we introduce R013 Developing technological solutions alongside the project life cycles and client's requirements and planning tools. This is carried out in the year 1 of the course to enable students to develop confidence in a range of software that they use. There topics are delivered holistically including theory and practical lessons. In year 1 students complete R013 Controlled Assessment and year 2 is heavy theory content in preparation for their examination in January. Learners also look further at factors to be considered when collecting and processing data and storing data/information and methods of processing data and presenting information to improve their understanding and practical knowledge. This gives an opportunity for any resits to be taken in June of the final year.

	Year	What is taught? Overview of Topics	Why this? Why then?
KS4	**10**	**Term 1 Theory:** Project life cycle Project Planning tools Mitigating Risks SWOT Analysis SMART goals	In term 1 students learn about the project lifecycle so they understand how computer systems in the real world are developed and the different stages that are involved in developing some of the very computer systems that students use daily. This is taught to give pupils an understanding of the different job roles that exists in the computing industry with the aim of motivating them to purpose an IT related job in the future. Project planning tools are an important component of systems analysis and development and are used in a range of project managements jobs across different industries. This is taught to allow students to practice different ways of presenting information and communication. It also involved teaching them several skills that are useful in future business employment e.g., creating a Gantt chart, SWOT analysis.

		Term 1 Practical: Data vs Information Database Structure & Tools Data manipulation Spreadsheet Modelling Presenting information **Term 2 Practical:** Project practice tasks Project report practice Project documentation Commencement of the controlled assessment project. **Term 3 Practical: Completing controlled assessment** **Term 3: Theory:** Data Collection Methods IT to support data collection methods Storage devices	Students learn about the different between data and information and database systems. The importance of database structures is relevant to the storage of data in today's technological driven worlds. It helps students understand how their data is stored by organisation and how data can be manipulated to produce useful information. The ability to look at data and know the best way to store it for time and space performance is a very useful skill to have and helps students to make links to how real organisations manage data. Students learn about spreadsheet modelling and presenting information. This is taught to help students develop confidence in a range of different software packages and understand the purpose of different software. Being proficient and confident in a range of ICT office applications is an asset when working in many businesses today therefore this helps to make pupils more employable. Teaching students to present information correctly helps them to produce high quality solutions promoting a high standard of work. All these skills will prepare students for the future. At the start of term 2 students will start some project practice tasks which are taught to help students to distinguish between different software and their tools, develop their IT skills and confidence. This is vital for commencement of the controlled assessment; however, this also helps them with IT skills required for their future. For example, to practice some report writing tasks which helps them to look carefully at their spelling, punctuation and grammar when presentation information. This is vital across any work that they do in their life and helps to improve their written communication skills. Halfway through term 2 students will commence their controlled assessment where they bring all their learning in year 1 together. This contributes to 50% of their grade in the subject. This is important to help students develop their time management skills, organisation, and an ability to meet deadlines – all vital in the world of work. In term 3 Data and information are explored further to look further at how data and information are used in the real world. This is vital to give students an understanding of how their data is process, what technology is used to collect and store data and the relevance of Big data in the world we live in today. The ability to look at data and know the best way to store it for time and space performance is a very useful skill to have and helps students to make links to how real organisations manage data. These topics help to give students a good start to year 2 on the course where we explore much more of the theory in preparation for their examination.

		Big Data	
	11	**Term1** Theory: Computer Threats • Malware • Social Engineering • Hacking • DDoS • Pharming Impact of a cyber security attack • Consequences of a cyber security attack • Prevention measures Current relevant IT legislation, at time of delivery, its implications, and applications Practical: Use of a range of software in lessons to support learning **Term 2** Understand the different methods of processing data and presenting information Exam style questioning to prepare for the exam	Students must know the types of threats that exist when collecting, processing data and storing data/information. For example, social engineering is the psychological manipulation of people into performing actions or divulging confidential information. They must understand: • why threats are used by the attacker • how they work • how to mitigate against them Students need to know what the legislation/Acts are and their purpose. They need to know what to do to abide to them. They must be able to apply this knowledge to different contexts in order to develop confidence when responding to exam style questions. Learners must be able to explain the implications of the current relevant IT legislation for an individual, for an organisation and on the data, including when dealing with cyber-security issues. This knowledge will help them to develop their knowledge from year 1 and improve their understanding of computer crime, cybersecurity, how to mitigate risks and legislation. This will help them prepare students for related exam questions and give further information about how organisations prevent computer crime. These lessons will also help pupil to develop their literacy skills and improve their written communication and exam technique. To develop further confidence in a range of different software types. To develop further confidence in a range of different software types and be able to select and justify appropriate software tools and techniques to process data to meet the defined objectives in a given context. This is relevant for all students to improve their confidence in a range of IT applications. Improved written communication skills and exam technique through writing, spelling and vocabulary practice.

		Term 3: Practice papers to prepare for the exam for any student not passed in January	Consolidation work for any pupils who have not passed the exam. Important to help build confidence and improve exam technique.

Key Stage 4

Computer Science:

- To be able to understand and apply the fundamental principles and concepts of Computer Science, including abstraction, decomposition, logic, algorithms, and data representation.
- To be able analyse problems in computational terms through practical experience of solving such problems, including designing, writing and debugging programs
- To be able to think creatively, innovatively, analytically, logically and critically.
- To understand the components that make up digital systems, and how they communicate with one another and with other systems.
- To be able to understand the impacts of digital technology to the individual and to wider society

To have the ability to apply mathematical skills relevant to Computer Science.

Key Stage 4 Computer Science: At KS4 we Study paper 1 in the unit order running alongside students learning programming skills through individual practical's

The reason paper 1 is taught before paper 2 is due to the original specification release which meant students could only complete their controlled assessment in year 11 of the course and paper 2 is heavily linked to this assessment element. Although this may change again for the new GCSE cohort 2019-2021 and a new specification will be released for 2020 – onwards which we will need to adapt for when released.

	Year	**What is taught? Overview of Topics**	**Why this? Why then?**
KS4	**10**	**Term 1 Theory:** 1 Systems architecture, Memory and storage **Term 1 Practical**: Programming fundamentals, Data Structures Inputs, Outputs, Variables, Data types, Selection, Iteration and String Manipulation.	This topic teachers the students the fundamentals of a computer and how a computer works. Understanding how data is stored within a computer sets the foundation for other topics within the course. The first topic learning about the computer allows the student to fully understand the innerworkings of the PC in order to appreciate how the computer can communicate and process data later on. Data structures are used all over computer programming and are the backbone of most of the code people write. They allow us to store data in a way that is useful to the programs we write. The ability to look at data and know the best way to store it for time and space performance is a very useful skill to have, the key concepts of this topic are embedded all the way through the KS4 course. Algorithm questions are on both paper 1 and paper 2 of Computer Science, students first need to understand the fundamentals of programming before they can begin to read, write, sort and search with algorithms. Writing algorithms is one of the hardest topic within computer Science, introducing algorithms in Term 2 means students can practice writing and understanding the logic behind algorithms throughout the course in prep for the exam and also means that they have learnt about programming skills in order to be able to create a program from an algorithm.

		Term 2: Theory: Computational Thinking Algorithms, writing, searching, sorting, tracing and editing **Term 2 Practical**: Higher level programming, random module subroutines, file writing and Boolean logic. **Term 3 Theory**: Data Representation and computational logic **Term 3: Practical**: Producing robust programs and testing	The topic is taught in term 2 because students will now understand and have practiced the fundamentals of programming, this topic builds upon the students' prior knowledge and allows the student to develop their coding structure in order to produce efficient code. Once the students understand how data is stored within a computer in terms of memory and storage, students need to then understand how the computer can process different types of data and understand the computers language of binary. Students will also have been taught about Boolean logic within their practical side of the course which makes learning about computation logic easier to understand The students will now have been taught all the programming skills they need for their GCSE exam, this topic teaches the students how to maintain their code in order to make it more robust so it does not crash on user input. Students need to understand all the basic of programming in order to be able to produce robust code, through iteration, input validation and try and except.
	11	**Term1 Theory**: Computer networks, protocols and Network security. **Term 1 NEA Assessment** **Term 2: Theory: Software and CS Issues** **Term 2: SQL** **Term 3: Revision**	Students are taught about networks at the start of year 11 because in order to understand how computers communicate, they need to understand about the inner workings of a computer, they need to understand about encryption and data compression to learn about threats and security to a network which is previously taught in Year 10. Students will be familiar with how to code as all skills have been covered. The NEA assessment is completed in the first terms because students will have covered all the programming skills including how to test in Year 10. Students are taught about the Operating system and utilities this is taught in year 11 as aits a relatively small topic and students are already familiar with concept of encryption, data compression, formatting a disk, different GUI and understanding backups. Students will now be able to understand and form arguments about using robots and algorithms for education, health problems. Students are taught about how to query a database and use wildcards, previous knowledge of programming constructs enables the students to grasp these concepts, e.g. and/or operator and comparison operators which is taught throughout the previous topics.

Key Stage 5

Topic Sequencing and Rationale Computer Science

	Year	What is taught? Overview of Topics	Why this? Why then?
KS5	**12**	**Term 1** Components of a Computer and systems software	This topic teaches the students the fundamentals of a computer and how a computer works. Understanding how data is stored within a computer sets the foundation for other topics within the course. The first topic learning about the computer allows the student to fully understand the innerworkings of the PC in order to appreciate how the computer can communicate and process data later on.
		Term 1: Paper 2: programming Techniques and Data Structures	Recap of programming skills from GCSE with a focus on data structure. Data structures are used all over computer programming and are the backbone of most of the code people write. They allow us to store data in a way that is useful to the programs we write. The ability to look at data and know the best way to store it for time and space performance is a very useful skill to have, the key concepts of this topic are embedded all the way through the KS5 course.
		Term 2: Paper 1: Software development and Data Types **Term 2:** Paper 2: Algorithms and Computational Thinking.	Algorithms are the biggest part of the exam papers in A-level, students first need to understand the fundamentals of programming before they can begin to read, write, sort and search with algorithms. Writing algorithms is one of the hardest topics within computer Science, introducing algorithms in Term 2 means students can practice writing and understanding the logic behind algorithms throughout the course in prep for the exam and means that they have learnt about programming skills in order to be able to create a program from an algorithm. Data types is a big topic for students who needs to remember several methods in order to perform normalisation and calculations – taught in the second term to allow students to become familiar with a difficult topic early on but also then used across the rest of the course through interleaving in order to keep the content embedded, easier for students to remember the GCSE content and develop the A level content.
		Term 2: OOP and Programming Paradigms	Students will be introduced to OOP, they will be taught how to code using classes and methods and to understand the benefits of using OOP including inheritance, polymorphism, and encapsulation

		Term 3: Exchanging Data and Computational Thinking. **Term 3:** Boolean Algebra and Web technologies	Taught in the last erm to help students who are using a database within their A-level Project, students can improve their project through embedded computational skills and database concept within their project to improve their mark. This topic is taught in term 3 prior to the AS – Level exam – student will build upon knowledge taught in the programming basics and data types which helps them understand the concepts of Boolean Algebra.
	13	**Term 1:** Legal Moral and Cultural Issues and Networks **Term 1** Practical: A level Project: **Term 2:** Algorithms and Data Structures **Term 2:** Revision and any isolation A-level content **Term 3,** first half - revision	Preparing students for the 9 marks questions at AS level, this topic allows students to use their existing knowledge to form arguments about the technological developing world. Networks are taught in term 3 as it's a small topic which recaps what the students were taught at GCSE Level. This topic builds upon previous content from year 12 and brings in the Alevel side, students will already be familiar with reading, writing, searching and sorting algorithms. This topic allows students to be able to calculate the efficiency of an algorithm using big notation, content from Alevel Maths is taught before this unit which helps students with the calculations. Algorithms are the biggest part of the exam papers in A-level, students first need to understand the fundamentals of programming before they can begin to read, write, sort and search with algorithms. Writing algorithms is one of the hardest topics within computer Science, introducing algorithms in Term 2 means students can practice writing and understanding the logic behind algorithms throughout the course in prep for the exam and also means that they have learnt about programming skills in order to be able to create a program from an algorithm. Data types is a big topic for students who needs to remember a number of methods in order to perform normalisation and calculations – taught in the second term to allow students to become familiar with a difficult topic early on but also then used across the rest of the course through interleaving in order to keep the content embedded, easier for students to remember the GCSE content and develop the A level content.