Subject overview: KS3 Computer Science

Subject Rationale (Intent) linked to whole school curriculum mission

In brief (no more than four sentences)

Computer Science will develop students' intellectual curiosity on the use of computing and technology within the world we live in. Students will have a robust understanding of the role of computing in our lives and will analyse situations through complex problem solving. Students will develop transferable skills that they can apply in the wider curriculum, future education or employment.

Additional details

The computer science curriculum is given direct guidance for KS3 content via the national curriculum. This incorporates the skills that need to be covered across the three year key stage, based on three key pillars: computer science, information technology and digital literacy. As a faculty we are keen to ensure the curriculum is broad, challenging and develops pupils' declarative and procedural knowledge. Therefore when mapping out the programme of study for each year alongside schemes of work, we ensure that subject content developed during prior learning is built upon, whilst also allowing for the breadth and depth of skills required for KS4. As a faculty we aim for students to develop a keen interest in the field of computer science. Pupils are taught the principles of information and computation, how digital systems work and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate - able to use and express themselves and develop their ideas through information and communication technology - at a level suitable for the future workplace and as active participants of the digital world.

		YEAR 7		
TERM	**Topic sequence** (What are you teaching?)		**Topic sequence rationale** (Why are you teaching this? How does it link to prior learning? Any notable links to **St Edmund's curriculum mission**	**Main method of assessment?**
Term 1:1	**E-safety** ● **Password & File structure** ● **E Safety File & Folder structure** ● **Using hardware and software** ● **Social Media & Cyberbullying** ● **Digital Footprint**		We begin Year 7 with the topic of E-safety to ensure students are instilled with safe digital habits when accessing their drive, the internet and methods of social media. Alongside good online organisation skills, it sets the foundation for ensuring students are safe online. This topic ensures students know how to stay safe online, what they should do and/or contact if they feel unsafe online and how they can make sure their information and data is kept private online. They will also develop their understanding of hardware and software components that make up computer systems. This will develop both pupils' declarative and procedural knowledge.	**Google form test for Hardware** **Comic Life Comic book**
Term 1:2	**E-safety** ● **Password & File structure** ● **E Safety File & Folder structure** ● **Using hardware and software** ● **Social Media & Cyberbullying** ● **Digital Footprint** **Photoshop** ● **Remove an object** ● **Basic photo editing techniques** ● **Magic wand tool** ● **Add an object** 　　**Lasso and select tool** ● **Use the liquify tool** ● **Use of layers**		This topic ensures students know how to stay safe online, what they should do and/or contact if they feel unsafe online and how they can make sure their information and data is kept private online. They will also develop their understanding of hardware and software components that make up computer systems. This will develop both pupils' declarative and procedural knowledge. Photoshop is sequenced to be taught following E-safety as students can develop their skills and understanding of the ethical use of images online. This topic develops procedural knowledge where pupils can understand how to create, re-use, revise and re-purpose digital artefacts for a given audience. They will also develop their declarative knowledge to understand the ethical issues around	**Google form test for Hardware** **Comic Life Comic book** **Practical assessed task applying skills**

		editing images and the trustworthiness, design and usability of sources.	
Term 2:1	**Photoshop** ● **Remove an object** ● **Basic photo editing techniques** ● **Magic wand tool** ● **Add an object** **Lasso and select tool** ● **Use the liquify tool** ● **Use of layers**	**This topic develops procedural knowledge where pupils can understand how to create, re-use, revise and re-purpose digital artefacts for a given audience. They will also develop their declarative knowledge to understand the ethical issues around editing images and the trustworthiness, design and usability of sources.**	**Practical assessed task applying skills**
	Spreadsheets: Creating spreadsheets, using different formulae, charts and macros ● **Features of a spreadsheet** ● **Lists and functions** ● **Absolute cell referencing** ● **If function and goal seek** ● **Formatting** ● **Charts and macros**	**Spreadsheets are sequenced to be taught to begin to develop students' understanding of the use of numeracy within computational abstractions and models.** **This topic develops declarative knowledge within spreadsheets, pupil's then develop their procedural knowledge by designing and evaluating computational abstractions that model the state and behaviour of real world problems and physical systems within spreadsheets.**	**Practical assessed task applying skills**
Term 2:2	**Spreadsheets: Creating spreadsheets, using different formulae, charts and macros** ● **Features of a spreadsheet** ● **Lists and functions** ● **Absolute cell referencing** ● **If function and goal seek** ● **Formatting** ● **Charts and macros**	**This topic develops declarative knowledge within spreadsheets, pupils then develop their procedural knowledge by designing and evaluating computational abstractions that model the state and behaviour of real world problems and physical systems within spreadsheets.**	**Practical assessed task applying skills**
Term 3:1	**Scratch Programming** ● **Sequencing in programming**	**Scratch is sequenced to be taught as it follows on from the understanding of models. We will enhance students**	**Create a scratch program**

	• Creating Variables • Selection programming • Operators in programming • Count controlled loops in iteration • Problem solving • Moving object in scratch	programming skills learnt at Key Stage 2. This topic builds on computational thinking and algorithms, whilst developing declarative knowledge. It allows pupils to explore block programming and the key programming constructs. Pupils will develop their procedural knowledge of programming when they create a range of programs using scratch.	
Term 3:2	Scratch Programming • Sequencing in programming • Creating Variables • Selection programming • Operators in programming • Count controlled loops in iteration • Problem solving • Moving object in scratch	This topic builds on computational thinking and algorithms, whilst developing declarative knowledge. It allows pupils to explore block programming and the key programming constructs. Pupils will develop their procedural knowledge of programming when they create a range of programs using scratch.	Create a scratch program

YEAR 8			
TERM	Topic sequence (What are you teaching?)	Topic sequence rationale (Why are you teaching this? How does it link to prior learning? Any notable links to St Edmund's curriculum mission	Main method of assessment?
Term 1:1	Data representation: How to complete binary addition and conversations between different bases. • Character sets • Understanding binary and denary to binary • Adding binary numbers together • Text representation • Image representation • Binary shifts	We begin Year 8 with the topic of data representation to build on their numerical understanding within computer systems. This topic builds upon computer systems and develops pupils' declarative knowledge on simple Boolean logic and some of its circuits and programming, as well as how numbers can be represented in binary. Students will develop their procedural knowledge by carrying out simple operations on binary numbers. They will also develop their understanding of how instructions are stored and executed within computer systems	Google form multiple choice assessment

	● Converting between hexadecimal and binary ● Converting between hexadecimal and denary	and how different data types can be represented and manipulated digitally.	
Term 1:2	**Data representation: How to complete binary addition and conversations between different bases.** ● **Character sets** ● **Understanding binary and denary to binary** ● **Converting between hexadecimal and binary** ● **Converting between hexadecimal and denary** ● **Sorting and searching algorithms** ● **Boolean logic**	**This topic builds upon computer systems and develops pupils' declarative knowledge on simple Boolean logic and some of its circuits and programming, as well as how numbers can be represented in binary. Students will develop their procedural knowledge by carrying out simple operations on binary numbers.**	**Google form multiple choice assessment**
	Control & Programming: Flowol ● **Algorithms using flowcharts** ● **Programming constructs** ● **Sequence** ● **Selectin** ● **Iteration**	**Control & Programming is sequenced building on the logical sequencing developed in the previous topic.** **This topic develops pupils' declarative knowledge on key algorithms that reflect computational thinking such as flow charts and to use logical reasoning to compare the utility of alternative algorithms for the same problem. Procedural knowledge will be developed with students applying this into the Flowol software.**	**Mimic**
Term 2:1	**Control & Programming: Flowol** ● **Algorithms using flowcharts** ● **Programming constructs** ● **Sequence** ● **Selectin** ● **Iteration**	**This topic develops pupils' declarative knowledge on key algorithms that reflect computational thinking such as flow charts and to use logical reasoning to compare the utility of alternative algorithms for the same problem. Procedural knowledge will be developed with students applying this into the Flowol software.**	**Mimic** **Written test**

Term 2:2	**Control & Programming: Flowol** ● **Algorithms using flowcharts** ● **Programming constructs** ● **Sequence** ● **Selectin** ● **Iteration** **Creating basic media products using ICT Digital skills** ● **Use the internet to find information** ● **Use tools to copy an image into an application** ● **Identify and explain strengths and weaknesses of posters** ● **Plan create and source graphics for a poster** ● **Create a simple logo** ● **Plan a house style for a presentation and construct a template to use** ● **Evaluate their work against a set of requirements**	**This topic develops pupils' declarative knowledge on key algorithms that reflect computational thinking such as flow charts and to use logical reasoning to compare the utility of alternative algorithms for the same problem. Procedural knowledge will be developed with students applying this into the Flowol software.** **Cear messaging in digital media is sequenced to be taught because it builds on prior knowledge of digital media in year 7.** **This topic develops pupils' declarative knowledge in creating a range of digital media products. In this unit pupils will evaluate, construct, logos, posters and digital presentations. They will use house styles to present work effectively.**	**Written test** **Theory unit assessed task applying skills** **Written test**
Term 3:1	**Creating basic media products using ICT Digital skills** ● **Use the internet to find information** ● **Use tools to copy an image into an application** ● **Identify and explain strengths and weaknesses of posters** ● **Plan create and source graphics for a poster** ● **Create a simple logo** ● **Plan a house style for a presentation and construct a template to use**	**Cear messaging in digital media is sequenced to be taught because it builds on prior knowledge of digital media in year 7.** **This topic develops pupils' declarative knowledge in creating a range of digital media products. In this unit pupils will evaluate, construct, logos, posters and digital presentations. They will use house styles to present work effectively.**	**Practical assessed task applying skills**

	• **Evaluate their work against a set of requirements** **App Development** • **Reviewing apps** • **creating simple app user screens** • **Apps with data inputs** • **Apps user user interaction** • **Designing and creating an app for a purpose** • **Creating variables** • **Identifying errors in coding**	**This topic develops students' declarative knowledge about the different types of apps, how they work and from this they will design, create and build apps for a given scenario.**	
Term 3:2	**App Development** • **Reviewing apps** • **creating simple app user screens** • **Apps with data inputs** • **Apps user user interaction** • **Designing and creating an app for a purpose** • **Design a questionnaire for feedback** • **Gather user feedback for your app**	**This topic develops students' declarative knowledge about the different types of apps, how they work and from this they will design, create and build apps for a given scenario.**	**Practical assessment**

YEAR 9			
TERM	**Topic sequence** (What are you teaching?)	**Topic sequence rationale** (Why are you teaching this? How does it link to prior learning? Any notable links to St Edmund's curriculum mission	**Main method of assessment?**
Term 1:1	**Programming (Python):** • **Variables and constants** • **Data types**	**We begin Year 9 with Programming to develop the basic programming skills taught in Year 8 with Flowol.**	**Practical assessed task applying skills**

	Operators **String manipulation** **IF statements** **Iteration for loops** **Iterations while loops** **Subprograms** **1D arrays** **File handling**	This topic will develop pupils' declarative knowledge on programming and will develop a high level of procedural knowledge with a textural programme language to solve a variety of computational problems which make use of data structures.	**Written assessment**
Term 1:2	**Programming (Python):** **Variables and constants** **Data types** **Operators** **String manipulation** **IF statements** **Iteration for loops** **Iterations while loops**	This topic will develop pupils' declarative knowledge on programming and will develop a high level of procedural knowledge with a textural programme language to solve a variety of computational problems which make use of data structures.	**Practical assessed task applying skills** **Written assessment**
Term 2:1	**Programming (Python):** **Subprograms** **1D arrays** **File handling** **Networking** **Internet connections** **Internet hardware** **Network topologies (LAN, WAN,PAN, STAR,BUS, MESH)** **Client Server and Peer to peer networks** **Cloud Computing** **Encryption**	This topic will develop pupils' declarative knowledge on programming with micro bits and will develop a high level of procedural knowledge with a textural programme language to solve a variety of computational problems which make use of data structures Networking is sequenced to be taught as a summative topic to tie together their understanding of computer science, information technology and digital literacy, and to allow students to have a broader understanding of these can be applied in the wider world through networking. This topic develops pupils' declarative knowledge of how networks operate in the wider world and the benefits and problems of various networks. There is an opportunity for students to learn about the modern day threats of hacking and	**Written assessment**

		how encryption is used to protect networks.	
Term 2:2	**Networking** ● **Internet connections** ● **Internet hardware** ● **Network topologies (LAN, WAN,PAN, STAR,BUS, MESH)** ● **Client Server and Peer to peer networks** ● **Cloud Computing** ● **Encryption**	**Networking is sequenced to be taught as a summative topic to tie together their understanding of computer science, information technology and digital literacy, and to allow students to have a broader understanding of these can be applied in the wider world through networking.** **This topic develops pupils' declarative knowledge of how networks operate in the wider world and the benefits and problems of various networks. There is an opportunity for students to learn about the modern day threats of hacking and how encryption is used to protect networks.**	**Written assessment**
Term 3:1	**Network Security** ● **Network Threats** ● **Identifying and preventing vulnerabilities**	**This unit builds on the networking unit covered in term 2.2. In this unit pupils will learn the different threats that affect computer networks. Then they will learn how to protect computer networks by identifying and preventing vulnerabilities.** **This topic develops declarative knowledge of how computer systems are protected**	**Written assessment**
	Hardware (networks/Boolean) ● **Architecture of the CPU (Input, process and output devices)** ● **CPU** ● **MEmory (RAM, ROM and Virtual MEmory)** ● **Secondary storage devices**	**Hardware is sequenced to be taught to build on students understanding of the need for relevant hardware to host efficient and effective networks.** **This topic develops declarative knowledge to identify the components within a computer and to describe how a computer works.**	**Written assessment**
Term 3:2	**Back to the Future** ● **Caesar Shift Cipher**	**Back to the Future is sequenced to develop students' understanding of basic algorithms learnt in Year with Flowol.**	**Written assessment**

| | | **Encryption** **Logic Diagrams and truth tables** **Sort Algorithms (Bubble and Merge)** **Search Algorithms (Linear and Binary)** | **This topic develops pupils' declarative knowledge of the design, use and evaluation of computational methods that model the state and behaviour of real world problems and physical systems.** | |