Computer Science Rationale

We aim to equip students to use computational thinking and creativity to understand and change the world. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Armed with this knowledge and understanding, students are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that students 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 in a digital world.

Computer Science Foundation Year Aims

The national curriculum for computing aims to ensure that all pupils:
- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- are responsible, competent, confident and creative users of information and communication technology.

YEAR 9	Content	Skills	Rationale
Autumn Half Term	**Project work** Database development	Students will develop practical skills in Microsoft Access. Give examples of databases used by organisations which are accessible to the public via the Internet Create a database table using several fields with different data types State the purpose of a primary key in a database Create a basic input form to input data Query the database using more than one criterion to find answers to user queries Create a basic report with suitable headings Create a front-end application menu with buttons linking to a form and a report	Understanding the basics of databases is a key building block in the understanding of how computers are used today. Microsoft Access is a program that not many people are familiar with, so it is motivating for students to feel that they are achieving new technical skills. **NC links:** 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
Autumn Half Term 2	**Project work** Python programming	**To cover the following programming fundamentals:** • the use of variables • Constants • operators • inputs • outputs and assignments The use of the three basic	In order to continue confidently on to GCSE Computer Science studies, students must be confident and capable programmers. A fun booklet of tasks should challenge and inspire students as well as helping them on their journey to becoming a 'computational thinker'.

		programming constructs used to control the flow of a program: 1. sequence 2. selection 3. iteration (count and condition controlled loops) Also: the use of basic string manipulation the use of records to store data the use of arrays including both one and two dimensional arrays Importantly, students will be introduced to sub programs (functions and procedures) to produce structured code.	Then a more extended problem which requires a programmed solution will be attempted. **NC links:** use two 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
Spring Half Term 1	**Theory** **Unit 1** Understanding computer systems - CPU, memory and storage	How data needs to be converted into a binary format to be processed by a computer How to convert positive denary whole numbers (0–255) into 8 bit binary numbers and vice versa How to convert from binary to hexadecimal equivalents and vice versa The relationship between the number of bits per character in a character set and the number of characters which can be represented (for example ASCII, extended ASCII and Unicode)	Students enjoy the success which can be achieved through being good at these "puzzle-solving" maths based questions. It is also a topic which many students need to revisit several times, therefore this place in the Autumn term works well. **NC links:** 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]
Spring Half Term 2	**Unit 3** Computational logic **Unit 4** Wired and wireless networks	Simple logic diagrams using the operations AND, OR and NOT Applying logical operators in appropriate truth tables to solve problems	**NC links:** understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming
Summer Term 1 & 2 PROJECT	**Project work** Website design and prototyping	Use a range of HTML tags to create well laid out web pages. Write CSS code to define the styles of different parts of a web page Use HTML and CSS to create their web page template Use the template to design a multi-page website with a consistent look	In order to facilitate a broad and balanced curriculum, year 9 students will undertake 3 extended projects throughout the year. These will enable study of IT and digital skills in broader contexts than just those on the computer science specifications. Students must have the opportunity to feel engaged and excited by their development work!

		and feel to each page	NC links: develop their capability, creativity and knowledge in computer science, digital media and information technology
		Use responsive design techniques in creating their website so that the web pages will adapt to any size of screen	
		Construct a good-looking, well-formatted interactive website that is suitable for its intended audience	
Summer Half Term 2	**Unit 5 Algorithms Unit 6 Ethical, legal and environmental concerns**		