Computer Science – Key Stage 4

Curriculum

Computing is an essential skill in life as it enables pupils to gain problem-solving skills and access other areas of learning more effectively.

	What pupils will learn	How it builds on learning
Year 10	Data Representation • Binary and Hexadecimal number systems, conversions, and calculations • Sound and image representation and storage • Data compression	Sets up the foundation for understanding how computers work and the basis for all logic and constraints for designing storage, and programming computers.
	Storage How data is stored in the main mediums of magnetic and optical storage, and SSDs.	Uses the knowledge about data representation to understand how data is stored for long term use, the mediums that can be used, and how they are used.
	Memory, the CPU, and Programming Languages • How memory is used within a computer system • How processes occur within the fetch execute cycle using the von Neumann architecture • Hierarchy of high- and low-level programming languages, and translation into machine code	Further extended knowledge on data and storage, extends knowledge to the understanding of computer memory, and how data and instructions form processes carried out by computers.
	Logic • Boolean logic • Logic gates and circuits	Brings together the knowledge of binary representation and Boolean logic to lead into computational thinking.
	Python Programming • Creating simple algorithms in the Python programming language • Writing extended programs that require the use of subroutines through structured programming	The Python programming language is revisited (having learnt its basics in Years 7 and 9) and extended to incorporate a fuller understanding of algorithmic solutions, data structures, and structured programming.
	Networks and Cyber Security • Wired and wireless networks • Network protocols • Security of Networks • Cyber security threats and prevention/damage limitation	Networks, their benefits, and security issues are introduced.
	What pupils will learn	**How it builds on learning**
Year 11	• Databases Relational databases • SQL	Relational databases are introduced, and the SQL language is learnt, drawing on understanding of data types and structures from algorithms and Python programming.
	Further Python Programming • Consolidation and enhancing of Python programming	

	Algorithms • Principals of computational thinking and algorithm creation • Data types and structures Programming constructs	Following on from the knowledge of logic circuits, and work done throughout KS3, algorithms are examined, and the basis of computational thinking is reinforced and extended.
	Software System software Application software	Different types of software are introduced, drawing on knowledge of the workings of a computer system.
	Legal, Ethical, and Environmental Issues • The law surrounding computer and data usage • Ethical issues that arise around computers • The environmental impact of computers	The legal, ethical, and environmental issues surrounding computer and data usage are explored, drawing on knowledge of the workings and issues surrounding computer systems and networks.

Assessment

Year 10

Pupils sit three formal, written assessments:

November – Formal Assessment 1 (autumn term's curriculum content)

February – Formal Assessment 2 (autumn term's and first spring half term's curriculum content)

July – Year 10 Mock (Year 10 curriculum content)

Year 11

Pupils sit two formal, written assessments:

November/December – Year 11 Mock (Past paper containing curriculum content covered)

February – Year 11 Mock (all course material)

Supporting your child

What you can do at home:

The most meaningful thing you can do to support your child in Computer Science is simply to take an interest and ask them to show you what they have been doing in lessons. We will teach everything in class and ensure suitable support is in place for those who may be struggling.

Equipment:

No additional equipment is required for Computer Science lessons.

Extended learning

Homework policy:

Homework is usually set weekly. Some homework tasks consolidate and practise work done within lessons, others prepare pupils for the content of subsequent lessons.

Clubs/ Enrichment opportunities:

For those keen to go beyond the classroom and do more in the Computing department we run several clubs at lunchtime and after school, including programming and revision of GCSE topics.

Extended study suggestions and reading lists:

All required programming skills will be taught in lessons, but for those wanting to go further we suggest the following 'teach yourself' websites:

Codecademy – free and paid courses covering a wide range of languages.
Khan Academy – free introductory and advanced courses for a wide range of languages.
Code.org – free courses and activities exploring computing concepts.

The CraigNDave YouTube channel is a good resource for all aspects of the course.

Possible trips and visits:

Pupils have the opportunity to visit Bletchley Park in Milton Keynes to explore computational history and attend specialised lessons from specialists from Bletchley Park**.**