Computer Science Curriculum Statement

Intent:

The Computer Science Department aims to enable all learners to become digital citizens – individuals that are able to employ the wide gamut of digital resources that are available to them in modern society. This involves the ability to realise the value of evolving and fast-changing technologies that are associated with the digital age. Alongside teaching the skills necessary to utilise these tools, we aim to enhance the knowledge and awareness of our pupils, so that they can judge the merits of data and information, developing an awareness of value and accuracy in regards to that which they find.

Implementation:

All year groups will learn techniques to locate data and develop this into meaningful information, using online resources. They will be taught to question the validity of data, looking at the source of the data, the author and their potential for bias, and the date of release of the data. Pupils will develop the strategy of cross-checking data in order to confirm accuracy, before using the data for their research. Using a variety of software tools, students will learn a wide range of methods where they will design and create their own digital assets. Whilst the particular nature of these products may vary significantly throughout the different year groups, the common thread throughout this learning is the use of a defined development framework, such as the Software Development Lifecycle. Pupils will learn to analyse the current situation and the need for a new asset before they embark upon an iterative cycle of design – implementation – test. Being able to reflect upon their project, pupils will always evaluate the success of the product that they have created, measuring it against the original requirements.

In programming, pupils will engage in a focal programming language, depending upon their year group. However, there will be numerous opportunities to develop awareness of alternative programming languages that could be used to meet the same ends, with some occasions where they might experience the use of these languages. At Key Stage 3, pupils are given an introduction to Information Technology practices, including effective use of common desktop applications such as word processing, spreadsheet and presentation software. Additionally, at Key Stage 3, pupils are introduced to programming using both block and textual programming methodologies, in accordance with the National Curriculum requirements. Here, they will be able to grasp the fundamentals of programming by designing and building creative projects. Alongside this, pupils are taught the importance of the safe use of information technology, including protecting their online identity and privacy. At Key Stage 4, the primary language employed is Python, as this provides all the common programming structures that would be expected of a modern programming language, whilst is not overly burdening regarding more complex syntactical layout. This use of Python builds upon the knowledge gained previously, aiming to reinforce the pupil's long term retention of key programming constructs. At Key Stage 5, the focus moves on to Java, which is a more demanding language with a more complex set of syntax rules and many more tools and libraries to use. Again, the previous subject matter taught in Key Stage 3 and 4 are built upon, where the fundamentals of the Python programming language already covered remain valid throughout the A Level specification. The use of Java is an intentional step towards preparation for employment and further education, where many Computer Science programs use Java as the foundation for teaching programming techniques.

Impact:

Students of Computer Science outperform in comparison to national averages, both across Key Stages 4 and 5. At Key Stage 5, the majority of students that complete A Level Computer Science carry on to study Computer Science at university or gain places in higher apprenticeships, where competition for places is very competitive. A session 3 program is in place that will enable pupils to engage in a number of activities to help them to continue in their development as effective digital learners. This includes providing a support network for younger pupils that are encountering initial difficulties in getting to grips with the demands of programming and algorithmic thinking, to providing a venue and support for A Level students to carry out independent work on their programming project.