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Computing and Digital Learning

Intent

Curriculum Vision

We are living in an increasingly digital age, and our learners approach a future where being computer literate is essential for all. Students are given the knowledge to confidently use and set up computer systems and understand technical terminology. Students learn to become computational thinkers, able to break down large problems into smaller steps and create algorithmic solutions. There is an ongoing demand for programmers, network engineers, software developers and system administrators and we will give our students the foundations to access these professions in the future. Students are taught to be able to communicate clearly and accurately with the aid of office software packages, which is essential given the expansion of international business and online trade.

In order that our learners are best prepared for their digital future, all year 7 students study a programme that covers an introduction to computational thinking, components of a computer system, web technologies and block-based programming, as well as the use of Microsoft Office. This programme also includes an introduction of programming using Python, a programming language which is compatible with major platforms and systems. In year 9, all students are introduced to more advanced computational methods and programming-based projects.

In key stage four students study programming at a greater depth, and hone and apply their computational thinking skills by developing computer algorithms and programs. Students will understand the design process, including using pseudocode and flow diagrams, to writing their code using Python. They will also develop a deeper understanding of the components of a computer and the computational process they facilitate.

Concepts and Skills

Through studying Computer Science, students will develop a deep understanding of:

- The Systems Architecture
- Memory and Storage
- Computer networks, connections and protocols

- System Software
- Ethical, legal, cultural and environmental impacts of digital technology
- Algorithms
- Programming Fundamentals
- Producing robust programs
- Boolean Logic
- Programming languages and Integrated Development Environments
- Information Technology

Students will also develop and apply the following skills:

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

Vocabulary

The Computer Science department will ensure all students:

- Have access to Powerful Vocabulary in their Class OneNote
- Students will be encouraged to use subject terminology in the correct context in lesson – modelled by teaching staff

KS3	KS4	KS5
Netiquette	Central Processing Unit	Busses
Cloud Computing	Arithmetic and Logic Unit	Memory Address Register
Input	Accumulator	Memory Data Register
Process	Cache	Pipelining
Output	Cores	Harvard Architecture
Hardware	Optical Storage	Parallel Processing
Software	Magnetic Storage	Paging
Hypertext Markup Language	Solid State Storage	Segmentation
Browser	Network	Scheduling
Hyperlink	Router	Software Development
Target Audience	Switch	Programming Paradigm
Purpose	Encryption	Addressing
Programming	Protocol	Inheritance

Homework

At Key Stage 3, students can complete weekly self-quizzing of key terminologies from their glossaries and knowledge organisers to focus on the core knowledge and Tier 3 vocabulary students need to succeed. Each lesson begins with a low-stakes Do Now task, targeting cumulative content from previous topics. This interleaved retrieval practice gives students repeated opportunities to revisit and consolidate prior learning, increasing fluency and reducing forgetting over time. At the end of each term, students complete a cumulative multiple-choice test. This assessment serves two key purposes: it promotes accountability for regular revision, and enables teaching staff to identify patterns of strength and gaps in understanding, which can then inform responsive curriculum planning.

Students in years 10 and 11 have additional online activities which will complement the content delivered in lessons. This will help embed the learning in students' long term memory, whilst also enabling teaching staff to identify gaps in knowledge to inform planning.

Homework helps our students achieve mastery in Computer Science. Students who need extra support to achieve mastery are supported by our 10:10 programme in Computer Science and all have access to our daily Homework Club.

Implementation

Overview Statement

The curriculum in Computer Science is sequenced coherently so that concepts and skills are developed over time. This supports students of all abilities, especially SEN students. Planning is informed by Rosenshine's Principles of Instruction and Cognitive Theory. Cross curricular links are explicitly referenced and exploited in order to deepen understanding. Homework, daily retrieval-based 'Do Nows' and termly low stakes knowledge organisers quizzes strengthen memory as do mid-term and end-of-year assessments which are cumulative. Vocabulary is developed in Computer Science through the Frayer Model and students are taught to read, write and speak like a Computer Scientist. Technology is employed in a variety of ways from using the online Class Notebook to setting online activities through virtual learning environments to strengthen learning. Learning character is developed each lesson through the use of the six Learning Applications (LApps).

Furthermore, we support students' academic progress by integrating online learning platforms directly into curriculum time to ensure consistent, structured access to high-quality resources. These platforms – such as Accelerated Reader and Sparx - offer adaptive learning, instant feedback, and personalised pathways that help address individual needs and close deficits of knowledge. Embedding them into the school day enhances engagement, accountability, and long-term academic outcomes by making digital learning a seamless part of everyday education.

The KS4 curriculum is based around the topics needed to succeed at GCSE incorporating mastery into each topic area – this will bridge the gap between GCSE and A-Level but also will give them the knowledge and skills to enable them to have an understanding of the digital world in which they live.

Impact

Key Stage Three

Through studying the Key Stage Three curriculum, students will be able to use Office 365 in education and the workplace; have a greater understanding of modern technology; identify the components of a modern computer system and how they work together; understand web technology; and write a simple program using block and text-based languages. Students develop all the Lapps but especially their resilience and creativity through coding and web design. Students have an introduction to the disciplinary literacy required to be able to communicate like a Computer Scientist, and all opportunities to develop numeracy are fully exploited in context, such as binary addition. Cognitive Theory is interleaved throughout the curriculum so that students gain a knowledge of how they learn and manage their cognitive load.

Key Stage Four

The Key Stage Four curriculum builds upon students' initial understanding, extending their knowledge in the areas of computational thinking, systems architecture, algorithms and programming techniques.

Through developing their knowledge of problem solving, identifying computer hardware, search and sort algorithms and program structures, they are able to identify and engage with computer systems. Students also develop an understanding of the entwined nature of their studies, though explicit cross-curricular links and inter-disciplinary study. Their progress in Computer Science is recognised through their GCSE entry, which acts as a benchmark of their mastery and provides them with the national currency needed for access to further education and employment. Students use their knowledge of cognitive theory to recognise and use the most impactful methods of revision and retrieval practice.

We have developed a course which is engaging, practical with an element of mastery included, encouraging creativity and problem solving. It encourages students to develop their understanding and application of the core concepts in computer science. Students also analyse problems in computational terms and devise creative solutions by designing, writing, testing and evaluating programs.

Students will be able to use these skills to continue their studies in Computer Science or to give them the tools to succeed and understand the digital world they live in.