Dallam School

Computer Science
Curriculum Intent

Why we teach what we teach

Our Computer Science curriculum focuses on using computer systems and software to meet user needs and solve problems. This requires logical thinking and problem solving skills. Computer Science aims to develop students computational thinking approaches enabling students to solve problems efficiently and logically, applying these techniques across the curriculum.
We aspire to produce students who are equipped to work in a 21st Century work place. Have an understanding of the technologies, algorithms and methods of digital communications that underpin many aspects of modern life. We aim for our students to understanding of how computers work, are able to use a range of problem solving approaches to develop and pro-gram solutions to real world problems.

Core concepts	**Computational Thinking** - These units will teach you how to think like a Computer Scientist. You will develop computational thinking approaches that you can apply across a variety of subjects to become a logical & analytical thinker. You will study existing algorithms that govern many aspects of your digital life and learn to evaluate their use. **Digital Literacy** - These units will teach you to you navigate & use modern desktop & cloud-based software, enabling you to succeed not only in Computer Science but also in your other subjects. You will learn how to be a good digital citizen & develop the digital skills needed for work & further education. **Data Representation** - These units will give you an understanding of how data is represented in the digital world, why this is the case and how we perform calculations in number bases commonly used by Computer Scientists. You will learn how different file formats are stored, how calculate file sizes and the uses of compression. **Computer Programming** - These units will teach you the how to program a computer to solve real world problems starting with visual languages such as BYOB and moving onto Python – the world's fastest growing language used by companies such as: Instagram, Google & YouTube. **Hardware** - These units will enable you to understand how the physical components of modern computer systems work, the protocols behind networking and data transmission. You will be able to evaluate the advantages and disadvantages of hardware and select components based on a scenario.
How our curriculum builds over time	Starting from a basic understanding how to access and use school computer systems, including the schools online learning platform Computer Science units are designed and sequenced to in introduce computational thinking approaches and their applications. Students are encourage to “think” and analyse why Computers & Algorithms work in the way they do and how, as Computer Scientists we can they can optimise solutions. Over time the curriculum, builds in complexity to enable students to show case their practical programming & problem solving skills. Layers of abstraction are peeled away as we go from a holistic view of computer function right down to how the individual semiconductors in your processor allow complex mathematical calculations. Basic mathematical principles of computation are built upon over time to enable students to understand how data is represented within a computer system.

Key ingredients of a lesson	Students are greeted as they enter & are immediately engaged in a purposeful starter activity with a clear time frame for completion. AFL or follow up questioning about the starter activity enables the teacher to gage understanding and direct the remainder of the lesson. Students are engaged and able to access work independently, support material, examples & extension tasks available These should be designed to stretch the most able. Teachers makes use of TA if applicable to support small groups of students identified using class data. Questioning is used to uncover misconceptions and correct these incisively. Questioning draws out common pitfalls before they occur and enables students to overcome these in practical tasks independent of teacher input. The teacher uses a variety of questioning techniques to ensure all students have to "think". Students know what they need to do to make progress and can demonstrate this by referring to mark schemes, progress pathways & feedback (peer or teacher).Feedback from formative assessment has obvious and significant impact. High expectations of behaviour are enforced consistently in line with the schools Behaviour policy. A plenary assesses what students have learnt, giving the teacher data/feedback needed to address gaps in knowledge or address misconceptions in the next lesson. Students ensure equipment, uniform and workspaces are tidy, leaving in an orderly fashion.
How we assess the knowledge, understanding and skills of students	Students are tested on their knowledge of how computer systems work both physically and theoretically. They will put their practical problem solving abilities to the test by designing and creating solutions to problems, working through examples and analysing potential solutions. A range of AFL techniques such as: questioning, reflect, Kahoot, Quizizz, Forms and MCQ's are used within lessons to gauge progress, address misconceptions and adapt practice. Summative assessments maybe practical or written tasks aimed at assessing the knowledge students have retained.
How we provide cultural capital and extra-curricular opportunities	Computer Science increases student sense of self-worth, resilience and agency through the positive experience of creating working solutions to challenges. There are a number of lunchtime clubs, which offer, delve deeper into programming concepts and approaches. We enter two national competitions each year, which allows students with higher abilities to compete in various rounds against other talented Computer Science student around the UK.
How we provide stretch and challenge enrichment	Each year students enter the Bebras Computational thinking challenge. These in the top 20% nationally enter the follow up competition. Dallam has several entries each year. We also enter the Cyber Discovery challenge each year in which students explore cyber security challenges and learn about digital forensics.
How we adapt our curriculum to meet the needs of all students	Work can be accessed online so that students are able to work at their own pace and revisit areas they may have found difficult in class. The Microsoft Office 365 immersive reader is modelled to allow EAL students to translate to their first language. Adaptive teaching strategies are employed to support all students to make progress. We allow student access to computers at break, lunch times, and allow sixth form students to borrow any additional equipment they may need for tasks that are more complex.
How we link our subject knowledge to the world of work and further study	Computational thinking can be used to think analytically and in a wide range of contexts and workplaces. Creating solution focussed adaptable problem solvers equips out students to work in a dynamic and face paced environment. SOL's are linked to real world applications and reference in lessons are emphasised. We have guest speakers explaining how Computer Science is used in academia and industry.
How we provide personal development for students	Students evaluate the impact Technology has on a range of ethical, moral and environmental concerns ranging from E-waste to individual privacy e-waste, the digital divide and potential applications of AI. Students are asked to reflect on how different cultures are portrayed on the internet and why or who is portraying them in this way. Moral development in Computer Science allows students to dis-cuss and analyse real and imaginary situations and reflect upon the consequences of their actions. Moral issues regarding violent games can be discussed and the potential consequences of playing such games.