

Computer Science

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Curriculum Rationale

The vision for the IT Faculty at Dean Trust Ardwick is:

“Pupils will be recognised as innovative leaders in their chosen field. Learners explore the way technology shapes all aspects of life including at home, at school and in industry.”

In an ever-developing world where online communication has become the norm it is essential that pupils are taught explicitly how to stay safe online and how they can use digital devices effectively, safely and appropriately to ensure that they will never knowingly be placed in a vulnerable position. This includes being able to identify appropriate hardware and software needed to be able to complete a given task. As this will support the pupils by developing transferable skills that can be taken out into the world of work. In addition to this, pupils will know the different types of computers, how they communicate and store data. This is imperative for pupils to know to ensure that they understand which devices can perform which tasks, and how specific data is saved within a computer system.

When teaching about cyber security, we deliver content regarding Sir Alan Turing, who helped develop the enigma machine which decoded encrypted messages during world war 2 and Sir Tim Burners Lee’s achievement of developing the World Wide Web is covered when discussing how computers are linked.

Curriculum Overview

- This is delivered in a clear and sequential manner that builds on the knowledge gained in Key stage 2 and previous years learning by revisiting the previous learning at the beginning of a topic and building in meaningful retrieval practice allowing pupils to easily and clearly make connections between the knowledge they already have and new content. As the Computer Science curriculum is in 3 segments (Information Technology, Algorithms and programming and Digital literacy) we are ensuring that all pupils are building on the knowledge that they have been taught throughout Key Stage 2 as the curriculum follows similar, but expanded pathways.
- Within the Digital Literacy strand, by the end of Year 6 all pupils should be able to Discuss the risks of online use of technology and Identify how to minimise risks. We look to build on their prior knowledge in Year 7 by teaching pupils how to stay safe online by analysing reliability of websites, looking at what is considered ‘fake news’ and how pupils can report this to keep themselves safe online. In Year 8 pupils use their prior knowledge to be able to identify threats both to the user and the machine that is in use, pupils will also be able to explain how to avoid these threats. In Year 9 pupils develop their knowledge even further by considering the impact that cyber security has on both the user and the machine.
- Through the algorithmic thinking and programming strand of the Computer Science curriculum when pupils arrive at Dean Trust Ardwick they should be able to design a solution by breaking a problem up, recognise that there are different solutions to the same problem, use logical reasoning to detect errors in algorithms, use selection in programs., work with variables and explain how an algorithm works. Pupils enhance this knowledge throughout year 7 by recapping the key elements of algorithmic thinking,

incorporating abstraction and decomposition into their solutions. The pupils will also use their knowledge of algorithms to create a flowchart using the correct algorithmic shapes. Additionally, pupils are also introduced to text-based programming through learning Python. Pupils begin to understand how text-based programming works and will understand the syntax rules behind the programming code. Pupils will then look to embed user inputs to the system. Pupils develop this further by debugging algorithms and programs, by identifying common errors. Pupils will develop the use of selection in their programming by fully understanding the purpose of it. Through the Year 9 curriculum pupils will be able to create algorithms in more than one method, visual and text based). Pupils will also develop the use of loops within their programming to take their work to the next level.

- The information technology strand of the curriculum is the traditional use of software. By the time pupils leave primary school pupils are expected to select and use and combine software on a range of digital devices. We build extensively on this throughout key stage three in order to ensure that all pupils are aware of the different types of computer systems we introduce the different types of computer systems that have developed over the past 20 years in Year 7. We build on this in Year 8 by looking at the different ways all of these mobile devices can communicate with each other through the use of networking and why that is so important in the evolving world. In Year 9, as pupils know how computers communicate, they begin to explore how the data is stored on computers and how computers begin to get the information ready to be communicated.
- This curriculum is designed in a cyclical way that allows pupils to revisit the content each year and build on the previous knowledge that they gained. In addition to this the pupils are also set regular pieces of home learning and classroom-based tasks that will encourage retrieval of this knowledge to ensure that the pupils have this knowledge readily available to them for the long term. Many of the tasks that pupils are given are practical tasks that are completed electronically, but it is usually completed after clear explanation, where pupils have been provided the knowledge in a clear and simple way, been shown how to complete the task by their teacher and provided models and support meaning they are much more likely to be successful when it is time for them to work independently.

There are two possible pathways that are available to the pupils within the Key Stage 4 Computer Science curriculum, GCSE Computer Science and Creative iMedia.

- The GCSE Computer Science builds on the algorithmic thinking and Computer Science strands of the Key stage 3 curriculum. Much of this content is delivered through clear explanation with a visual presentation, meaning that pupils have explicit instruction and practical hands on experience. Programming plays a large role within this specification and as such pupils will build on the knowledge gained throughout the key stage 3 curriculum to make programming more efficient.
- With the Creative iMedia curriculum, this builds on the digital literacy and Information Technology aspect of Key Stage 3 curriculum, with the practical application of software with the creation of a product for a given brief, similar to those job roles in the world of work. Pupils will practice skills and develop them before moving onto the brief they are asked to complete for the unit they are asked to complete. The pupils will develop knowledge of the uses and purpose, how to design, create and evaluate digital products in graphics, animations and websites.
- Skills that are developed throughout the two areas that are offered at Key Stage 4 allow the pupils to develop real world skills that are transferable to the world of work. This is imperative to enable all pupils future successes when they leave Dean Trust Ardwick.