Year 8

Department of Computer Science

OVERVIEW

Our Key Stage 3 Computing curriculum has three pillars. Firstly, we wish to develop students' digital literacy so that they can use IT to extend their learning in all areas, to communicate effectively, to develop their ideas and to solve problems: furthermore, they should be able to do so safely. Secondly, we teach students the fundamentals of Computer Science; to understand how digital systems work and how they are programmed. Thirdly, we teach students the skills that are needed to be able to use application software found in the working environment such as spreadsheets and desktop publishing. These three pillars are covered across six strands. In each year, we will cover some of these strands, building on previous learning.

We hope that this curriculum offers enjoyment and opportunities beyond our day-to-day use of technology, while delivering a wide enough breadth of topics that everyone takes an interest in Computing in some form. By the time comes to make GCSE options decisions, students should be enabled to make an informed choice about whether to opt to take GCSE computer Science in Key Stage 4 and beyond.

Skills Developed

The year 8 curriculum builds the foundations of the GCSE, introducing concepts such as binary, databases, cyber security and procedures.

We start the year with a fast paced S5: Cyber Security unit, introducing high-level recognition of topics such as HTML, cross-site scripting and encryption. We learn about common security weaknesses and how they can be exploited so that we can protect against them. This unit has culminated in a whole year entry into the NCSC CyberFirst competition from 18th November until 27th November. For the past two years, we have been successful in being crowned the South East winners and have taken the winning team of four to Belfast and Oxford overnight as part of the Celebration events.

In our S1: Understanding Computers unit, students will look at the history of computers and discover why the physical technology resulted in the use of binary in computers. We look at how binary numbers are calculated from decimal numbers, how to add, multiply and divide two binary numbers. Students also learn how these binary codes can be used to represent the data on the computer such as text and images.

In the S2: Data Analysis unit, we discover what a database is using a range of different database software and how to use basic SQL commands to search through the data.

In the S3: Programming Concepts unit, students will use a combination of text-based coding to discover how objects and methods are used in a program, and apply the skills of programming discovery to investigate how to make a robotic car move according to a desired outcome.

In year 8, the students will also cover the S6: Impacts of Technology unit through a Discovery Report, in which they use resources to find out what is new and exciting to them in the world of Computing, creating a news article in Canva to explain it to others in the school. We will also look at layouts in Desktop Publishing at this point as part of the S4: Digital Media strand. We also look at the advantages and disadvantages of Artificial Intelligence, investigating how it is being used for making the world better but also discussing the implications of any ethical and environmental issues that might be raised by its use.

Topics covered

Unit	Key Concepts
 **8S1 Data Representation**	• How did computers develop over time? • What is binary, how and why do we use it? • Basic binary arithmetic • Using binary to represent text and images
 **8S2 Databases and SQL**	• What is a database? • What terminology do we use? • How do we find data in a database? • What control words can we use to search using SQL?
 **8S3 Objects and methods**	• What is an object and how do methods relate to them? • What are parameters and how do they affect methods? • What are properties and how do they differ from methods? • How do we apply our learning from 7S3 to the motors in the robotic car? • What are autonomous vehicles and where are they used? • Can we program our car to be autonomous?
 **8S4 Printed publications (linked to 8S6)**	• What components make up a news article? • How can we use columns to space out the information? • How do we use Frames to insert images? • How do we use guidelines to align items? • Why does font style and size matter? • What impact does justification have on reading?
 **8S5 Cyber Weaknesses** **NCSC CyberFirst Competition**	• What can we do with technology to keep our data secure? • What is cryptography and what different ciphers are there? • How is JavaScript used to create interactivity on websites and what weaknesses does it open up? • What is Cross-site scripting and why is it a weakness? • What are the legalities of hacking and what is ethical hacking? • All students are teamed up to participate in the CyberFirst Competition.
 **8S6 Impacts of Technology**	• What is going on in the world of Computing? What do we find interesting? • What are the advantages and disadvantages to society and our environment? • What is Artificial Intelligence and is it brand new? • What is it being used for? • What are the ethical implications of using AI and can it be fully trusted?

How we support and develop your daughter

All lessons are accompanied by a SharePoint page which will be linked to in your daughter's subject MS Team. These are used as support and guidance in class so that your daughter is able to follow at their pace and keep track of the steps as they need. They are not a replacement for the specialist teachers that will be guiding them in the lesson, but they do act a good support resource both in class and at home.

Where we have covered a strand previously, the data will be used to identify where students struggled last time, and extra support will be put in place to enable them to access the next unit. This will not always be overtly done.

If a student has a problem with a homework task, she should get in touch with her teacher via Teams at least 48 hours before the deadline. This gives us a chance to respond during work hours. Where the answer is not a quick fix, we will use our discretion to extend their deadline until after we can meet with them, which may be in the next lesson.

Where a student is struggling in a particular unit, or shows signs of persistent low achievement, we will also try and provide a 1:1 peer mentor from the year above. These students are volunteers who give up their lunch breaks to take their mentees through the work. For our more confident students, we encourage them to volunteer in year 8 onwards to be a peer mentor. This develops relationships between year groups and enhances their explanation skills enabling them to achieve more in their own work.

Our Year 12 and 13 A-level Computer Science students run a Coding Club once a week. Our Year 9 and 10 students run a Cyber Club for KS3 students. They have been successful in winning the NCSC CyberFirst Competition two years consecutively. Attending these clubs is a great way to be inspired by older students and to learn skills not met in class.

We encourage your daughter to take part in a variety of competitions throughout KS3 and we wish we could support more, however, staffing it is instrumental to success and it not always achievable.

How you can help your daughter

It is really important that students submit all homework, so they must be encouraged to do so. This allows teachers to identify any learners who may be having difficulty and adjust lessons accordingly. Not all homework will be formally marked. All Computer Science homework is set on Teams and students should be checking in frequently.

We are a Microsoft-based school and, as such, having a computer that can run MS Teams will give your daughter the best chance of achieving their potential. We cannot recommend purchasing a tablet as your daughter's sole computer. Where possible, we would ask you to encourage them to use a proper keyboard and mouse so that they can access the work easily in class. We try to use software that have an online version, but this isn't always possible, so students are required to access the software through the remote connection or by making use of the IT facilities in the LRC.

Students who miss lessons due to other commitments, such as sports fixtures or music lessons, are expected to discuss the lesson with a classmate and catch up prior to the next lesson. If you are signing your daughter up for other commitments, please check with them regularly to check that it is not having an impact on their academic work.

If your daughter is ill and misses a lesson, we ask that they make sure they are well enough to come to school before trying to catch up on the work missed. Once they are back, they should then discuss what they have missed with a classmate and catch up on any work missed. Their deadline will be extended to account for this.

We do ask that you support your daughter by enhancing what they are learning in class and not trying to change how we are teaching them. If we ask them to use a particular bit of software, there will be good reasons for it. If you are helping with homework, that is great! However, please allow your daughter to do the actual work herself. From experience, where a parent has been involved in the actual work either through demonstration or leading by example, the student then cannot explain what they have done which affects their long-term attainment. It can be helpful to look back over the resources from the last year's unit in that strand and discuss how it might apply to this unit. Your daughter will have access to previous SharePoint pages through the Class Team and the CS Homepage. They will also have their exercise book which they will need to maintain over the whole of KS3.

We love that so many of you are role models in the computing industry – be it software development, IT systems, electrical engineering, graphic design, medical research, teaching, et al. If you are able to offer your time to record a short video that tell us about what you do and how it relates to Computer Science, we would love to compile a collection of these to really encourage the students to consider how computers will affect their future careers. We also have a poster that you can personalise for us to display on SharePoint to showcase all of your roles in industry. This is available in the Computer Science Year 7 resources which your daughter has access to.

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