

Computing Department

Curriculum Intent

Computing skills are a vital component to any student's future success when they leave Carnforth High School. Through engaging content and a supportive environment, pupils will develop the skills and understanding that allow them to safely and confidently use technology in the real world; building their digital literacy, helping them become good "digital citizens" and preparing them for further study or job opportunities in the technology sector and beyond.

There is a common misconception that if a student can use a device, such as a smartphone, tablet or games console, to access social media or play games, they must be a confident digital technology user. As a department, we know there is so much more to using digital technology safely and effectively, and we strive to ensure students can control their devices and the software included, rather than be controlled by pre-set decisions and options.

This means ensuring that all students leave the computing department with the ability to:

- Use office productivity software, file management systems and communication systems confidently.
- Keep safe when using technology, particularly when online, and understand the dangers of putting too much trust in digital systems.
- Use computational thinking skills to understand and solve real world problems.
- Create digital resources which bring together a range of software skills.

Having competent skills in Computing provides students from all backgrounds and abilities with the potential to improve their progress in a wide range of subjects inside school, as well as opening future opportunities beyond the classroom walls.

Key Stage 3

Year 7	Students study the following units:
Digital Literacy:	We learn to use the Office 365 suite efficiently while ensuring students understand basic e-safety practices as they start secondary school. This will include an introduction to school systems, use of OneNote for classwork, presenting information to an audience, managing emails in Outlook and effective web searching. We also discuss the use of social media and the need to keep personal data safe.
Computer Systems:	In this unit, students learn about what a computer actually is, as well as the key components which make up all digital devices and how these interact to allow computer software to run. They learn about different software types and what their purposes are, being able to pick suitable software to complete a range of everyday tasks. Pupils are introduced to binary, allowing them to understand how computers interpret data.
Scratch:	We start to introduce the programming concepts of Sequence, Selection and Iteration using Scratch. Students learn how the concepts of computational thinking allow them to create more complex programs. Students use the ideas of abstraction and decomposition to help design algorithms and solve set problems.
Spreadsheets:	Pupils are introduced to spreadsheets and will learn how to model data, make calculations, utilise formulae and functions, and present data in different formats, such as graphs. Students develop several skills that are linked to real world application.
Graphics Editing:	Students will be introduced to graphics types and their properties, learning how to convey meaning through graphics and producing a graphic product using a range of editing tools and skills in suitable software. This unit also provides a great opportunity to discuss the application of copyright law when sourcing materials.
Year 8	Students study the following units:
Digital Wellbeing:	Building on the basic introduction to e-safety in year 7 and learning from Life lessons, students begin to delve deeper into the darker world of technology and how it can be used negatively. We learn about the impacts of online abuse and the spreading of false information, an overview of computer misuse and methods of keeping ourselves safe online. Pupils also learn about the law & legislation and the health & safety issues that may affect our use of technology.
Computational Thinking:	Building on the introduction to computational thinking skills that pupils learn in year 7, we look at the use of the logical thinking and problem-solving skills that are used to complete tasks. Developing the four computational thinking corner stones of algorithms, abstraction, decomposition and pattern recognition, we will look at how we apply these to real problems. We also develop our understanding of binary, learning how to perform binary addition and understand the use of hexadecimal.
Python Programming:	Students begin their study of a second programming language, this time text based. They review the concepts studied in year 7 of sequence, selection and iteration. Students will produce a range of programs with increasing complexity. Students will understand that there are a range of solutions to the same problem and why some solutions are more efficient than others.
Databases:	Students are introduced to an alternative method of storing and manipulating data with the use of databases. We look at the benefits of relational databases and how we can add, edit and delete data in tables. Students will be able to query data and output information that is suitable for the needs of a user. Students will also be introduced to SQL.
Audio Editing:	This unit builds on the creative skills from the graphics unit covered in year 7. Pupils will plan a radio advert, source resources appropriately, create and review their clip in the audio editing software Audacity. This will give pupils an insight to the world of music production and content creation.



Year 9	Students study the following units:
Cyber Security	Students continue to develop their understanding of how to use computers safely, building on our work from year 7 and 8. This unit specifically focuses on the world of cyber security, looking at different types of online scams, malicious software (malware) and the methods we can utilise to tackle these issues. We also look at the possible careers available in the world of cyber security, as well as the routes into these careers.
Data Representation:	This unit continues to build on pupil's understanding of how computers work, looking at how binary code is translated into elements such as text, images and audio. Pupils will demonstrate their ability to convert binary and denary numbers, converting into ASCII characters, colours within bitmap images and samples of sound.
Web Design:	This unit builds on student's programming skills, but offers a step into an alternate programming language. The skills developed in Y7 and Y8 in using planning, developing and testing skills, when programming, will all be useful in this unit. Students learn to code in HTML to create their own web pages, as well as CSS and JavaScript, to apply style and interaction. This unit is aimed to teach students that anyone can create an online presence and looks at some of the early web pioneers.
Computer Networks:	This unit builds on the computer hardware unit from year 7 by looking at how connecting devices can improve productivity and efficiency. We start by looking at Local Area networks to secure key concepts and then expand to the Internet and the World Wide Web. Students also look at the hardware required to connect computer devices.
Impact of Digital Technology	Students continue to develop their understanding of the impact when using digital technology, gaining a more wide-spread view of how technology is utilised in the real world, beyond their own everyday experiences. Students are provided with the opportunity to discuss the use of developing technology, such as artificial intelligence, self-driving cars, robotics and medical applications, understanding the balance of positive and negative arguments surrounding modern technology. We also look at the environmental impact of using technology.

Year 10	GCSE Computer Science - Students complete units in Computer Networks, Fundamentals of Cyber Security, Relational Databases & SQL, Fundamentals of Algorithms and Programming.
Programming Fundamentals:	In this unit, pupils are re-introduced to Python programming, giving the opportunity to recall and retrieve the skills they built in year 8 and year 9. We will emphasise the importance of some basic elements, such as data types, the difference between variables and constants, assignment, iteration and selection.
Computer Systems:	This unit allows students to build their understanding of how computer systems work, looking at the hardware and software elements in greater detail, while introducing topics such as Boolean logic and classification of programming languages.
Programming – Next steps:	Students will continue their programming development, looking at the use of subroutines, utilising different methods of iteration, using nested selection and iteration, methods of string handling, demonstrating the use of data structures and generating random numbers.
Algorithms:	In this unit, students will get to grips with representing algorithms. They will be able to apply the computational thinking concepts covered previously, determine the purpose of algorithms and understand that different algorithms may be used to solve problems, comparing the efficiency of different examples. Students will also learn about different searching and sorting algorithms.
Data Representation:	This unit builds on student's previous experience of using number bases, making sure they are confident in converting binary, denary and hexadecimal numbers, understanding different size values and being able to complete binary arithmetic. We will introduce binary shifts and will take an in-depth look at how binary is used to represent images and sound. Students will also learn about different methods of lossy and lossless compression, including run length encoding and Huffman coding.
Computer Networks and Cyber Security:	This unit will help pupils build on their understanding of basic network structures, such as LANs and WANs to compare the value of wired and wireless networks, the benefits of different network topologies and will look at the use of network protocols, including an in-depth look at the TCP/IP model. It will then provide pupils with the opportunity to dive deeper into the world of cyber security threats, learning about a range of potential issues we may face when using computers, including different methods of social engineering. Students will also be aware of a range of methods used to combat these threats.
Year 11	AQA GCSE Computer Science
Ethical, Legal and Environmental Impact of Digital Technology:	Students learn about the current ethical, legal and environmental impacts and risks of digital technology on society, including data privacy issues. We will discuss topics such as; cyber security, mobile technologies, cloud systems, wearable technology, implants and autonomous vehicles.
Databases:	This unit will embed the understanding of relational databases and key database concepts. Students will understand that the use of a relational database facilitates the elimination of data inconsistency and data redundancy. We will be able to use SQL to retrieve, insert, edit and delete data in a database.



Programming – Robust and Secure:	This unit focuses on allowing pupils to practice their programming skills before the exams, while reiterating the importance of robust and secure programming. Students will understand the importance of testing and how to use different types of test data. Students will also be able to confidently categorise different types of error.
Revision:	Pupils will undertake a unit of revision, partially based on weaknesses identified in mock exams, to focus on improvement in both understanding of subject content and exam technique.

Impact

Assessment

KS3:

At Key Stage 3, assessment is done regularly in lessons through the use of online quizzes and mini knowledge checks of key concepts. During practical lessons, students have achievement checklists they should use to monitor their progress. At the end of each theory unit, there is a summative assessment which asks students to demonstrate what they have learned during the teaching of that topic. In practical units, assessment is ongoing as a piece of work is developed over several weeks.

KS4:

AQA GCSE Computer Science

Course Syllabus: <https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525>

Component	Weighting	Assessment	When
Paper 1 – Computational Thinking and Programming Skills	50%	Written Exam – 1 hour 45 minutes	May/June - End of Year 11
Paper 2 – Computing Concepts	50%	Written Exam – 1 hour 45 minutes	May/June - End of Year 11

Department

Subject Leader: Mr I Martin imartin@carnforthhigh.co.uk

Mr D Hacking dhacking@carnforthhigh.co.uk

Miss G Campbell gcampbell@carnforthhigh.co.uk