

## 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**

<b>Year 7</b>	Students study the following units:
<b>Digital Literacy:</b>	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.
<b>Hardware &amp; Software:</b>	Students learn about the basic components which make up all digital devices and how these interact to allow software to run. They learn about different software types and what their purposes are. Pupils are introduced to binary.
<b>Scratch:</b>	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.
<b>Spreadsheets:</b>	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.
<b>Graphics Editing:</b>	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.
<b>Year 8</b>	Students study the following units:
<b>Digital Wellbeing and Cyber Security:</b>	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 false information, different types of computer misuse and the methods we can use to try and protect ourselves against these threats. Pupils also learn about the law & legislation and the health & safety issues that may affect our use of technology.
<b>Computational Thinking:</b>	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 solve problems. Developing the 4 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.
<b>Python Programming:</b>	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.
<b>Databases:</b>	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.
<b>Mobile App Development:</b>	This unit builds on the skills from both the programming and graphics units covered in year 7. Pupils will develop the skills to design, create and test an application in the web-based software AppShed, working on both the visual elements of the user interface, and the block programming to make the application work.



<b>Year 9</b>	Students study the following units:
<b>Impact of Digital Technology:</b>	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 and begin to develop pupil's understanding of the possible careers available in the world of technology.
<b>Computer Networks:</b>	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.
<b>Programming Project:</b>	This unit provides the final opportunity for pupils to embed their programming skills with Python, building on their year 8 work, with a mini project that will allow students to develop some new skills, while independently showcasing skills we have built previously. Students will be expected to show design skills, using algorithms, practical skills in developing a program to solve a problem and show that they can test and evaluate a program against its given purpose.
<b>Web Design:</b>	This unit builds on the Computer Networks unit by teaching students how to create a webpage. 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.
<b>Digital Enterprise:</b>	In this unit, pupils will have the opportunity to refine, improve and display a number of skills to build a brand present it to an audience. They will utilise their graphics skills to create items such as a company logo and advertisement of the company, build a webpage to promote their product, use a spreadsheet to manage accounts, and use a database to manage customer information. All while utilising appropriate hardware and software.

<b>Year 10</b>	GCSE Computer Science - Students complete units in Computer Networks, Fundamentals of Cyber Security, Relational Databases & SQL, Fundamentals of Algorithms and Programming.
<b>Programming Fundamentals:</b>	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.
<b>Computer Systems:</b>	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.
<b>Programming – Next steps:</b>	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.
<b>Algorithms:</b>	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.
<b>Data Representation:</b>	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.
<b>Computer Networks and Cyber Security:</b>	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.
<b>Year 11</b>	AQA GCSE Computer Science
<b>Ethical, Legal and Environmental Impact of Digital Technology:</b>	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.
<b>Databases:</b>	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.



<b>Programming – Robust and Secure:</b>	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.
<b>Revision:</b>	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**

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