

Curriculum Intent:

The Computer Science curriculum at Northampton Academy looks to inspire and engage students in the different areas of using technology. In year 10, students have chosen this subject as a GCSE option. We follow the Edexcel GCSE specification which includes topics on data representation, hardware and software, networks, issues and impact and programming concepts. Throughout the 2 years studying this GCSE, we intend to provide the students not only with skills to be able to complete the written and computer assessment in the summer but also with knowledge of different careers and pathways they can take using their computing skills.

'Why This, Why Now?'

- Each term focuses on a new topic as well as having one lesson a week where students learn programming skills. Having this programming lesson each week allows students to practice and learn programming skills from the very start which is necessary as it is the most challenging aspect of the GCSE.
- As the topics are quite different and don't interlink particularly in any way, we teach the theory aspects in order of how they appear in the specification in year 10 into year 11:
 - Data representation
 - Hardware and software
 - Networks
 - Issues and impact
 - Algorithms

Medium Term Planning Document: Computer Science Year 10 2022-23

The Medium Term Planning document below is designed to show the journey that every student takes through our curriculum. Some elements of the curriculum may be taught over several lessons, others in a single lesson.

Computer Science	Year 10 – Half Term 1			
Topic	Content	Formative Assessments?	Link(s) to an example lesson	
Data representation and programming basics	Binary and binary conversion Binary addition Programming: variables, constants, data types	Mini whiteboards Bell work recap questions Home learning quizzes End of topic test	https://classroom.thenational.academy/lessons/binary-maths-68rkae https://classroom.thenational.academy/lessons/variables-60w3je?from_query=programming+languages	
	Twos complement Programming: input and output Types of errors		https://classroom.thenational.academy/lessons/binary-maths-68rkae	
	Binary shifts Hexadecimal Programming: arithmetic operators		https://classroom.thenational.academy/lessons/hexadecimal-75gkcr	
	Representation of text Representation of images Programming: strings		https://classroom.thenational.academy/lessons/representing-text-chk66t https://classroom.thenational.academy/lessons/representing-bitmap-images-6rr36e https://classroom.thenational.academy/lessons/string-handling-i-6wtkac	
	Representation of sound Programming: strings		https://classroom.thenational.academy/lessons/representing-sound-6mt3ed	
	Data storage Catchup and Recap lessons, practice exam questions		https://classroom.thenational.academy/lessons/units-of-measurement-6rv36d	
	Programming: strings and formatting			
	Compression Programming practice			
	Key Words: binary, denary, computer, input, output, hexadecimal, twos complement, images, sound, resolution, sampling			
	Career focus - Task 1 Machine learning engineer & Task 2 Forensic Computer analyst			

Computer Science	Year 10 – Half Term 2
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Topic	Content	Formative Assessments?	Link(s) to an example lesson
Computers and programming with selection and iteration	What is a computer? Stored program concept	Mini whiteboards Bell work recap questions Home learning quizzes End of topic test	https://classroom.thenational.academy/lessons/computer-systems-and-system-software-cmuk4r
	Programming: selection and relational operators		https://classroom.thenational.academy/lessons/main-memory-cthkid
	Fetch execute cycle		https://classroom.thenational.academy/units/programming-2-selection-cbc4
	Programming: selection		https://classroom.thenational.academy/lessons/the-fde-cycle-68w3ct
	Secondary storage Programming: nested if statements		https://classroom.thenational.academy/units/programming-2-selection-cbc4
	Embedded systems Programming: if statements and validation		https://classroom.thenational.academy/lessons/secondary-storage-6cv3jt
	The operating system Programming: if statements and validation		https://classroom.thenational.academy/lessons/selecting-a-storage-device-74v64c
	Utility software Programming: iteration – while loops		https://classroom.thenational.academy/units/programming-2-selection-cbc4
	Robust software Programming: iteration – while loops		https://classroom.thenational.academy/lessons/computer-systems-and-system-software-cmuk4r
	Key Words: selection, CPU, RAM, ROM OS, Secondary storage, magnetic, optical, solid state, HLL, compiler, interpreters, translators, stored program concept		
Careers-Focus: Task 3 Smash that interview & Task 4 Hobbies and careers			

Summative Assessment:

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Pupil Mid-Year Assessments will take place at the end of half term 2. These will cover all content taught in the first 2 half terms. This assessment will inform pupil Rank Order in the subject.

Computer Science Year 10 – Half Term 3			
Topic	Content	Formative Assessments?	Link(s) to an example lesson
Networks and programming with iteration and arrays	Mid year assessments	Mini whiteboards Bell work recap questions Home learning quizzes	
	Programming languages and translators		https://classroom.thenational.academy/units/programming-3-iteration-2e20
	Programming: for loops		https://classroom.thenational.academy/units/programming-3-iteration-2e20
	LAN's and WAN's Wired and wireless		https://classroom.thenational.academy/units/programming-3-iteration-2e20
	Programming: for loops		https://classroom.thenational.academy/lessons/what-are-networks-70r6cd
	Topologies		https://classroom.thenational.academy/units/programming-3-iteration-2e20
	Programming: while loop and for loop practice		https://classroom.thenational.academy/units/programming-3-iteration-2e20
	Data transmission		https://classroom.thenational.academy/lessons/network-speed-and-performance-c8r38t
	Programming: 1D arrays		https://classroom.thenational.academy/lessons/arrays-and-lists-6tjk8t
The internet and protocols	https://classroom.thenational.academy/lessons/the-ip-suite-and-packet-switching-6rrp6d		
Programming: 1D arrays			
Key Words: network, topology, encryption, protocol, internet, IP, packet switching, ethical hacking			
Careers Focus : Task 5 Meet the team and Task 6 Green Careers			

Computer Science Year 10 – Half Term 4			
Topic	Content	Formative Assessments?	Link(s) to an example lesson

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Issues and Impact and programming with arrays	Identifying vulnerabilities	Mini whiteboards Bell work recap questions Home learning quizzes	https://classroom.thenational.academy/units/impacts-on-society-fb09
	Programming: for loops and 1D arrays		
	Encryption		
	Programming: 1D arrays and formatting		https://classroom.thenational.academy/units/impacts-on-society-fb09
	Environmental issues		
	Programming: 1D arrays and formatting		https://classroom.thenational.academy/units/impacts-on-society-fb09
	Ethical and legal issues		
	Programming: 1D arrays and formatting		
AI and Algorithmic bias			
Programming practice			
Key Words: impact, ethics, moral, legal, copyright, patents, algorithmic bias, AI			
Careers Focus: Task 7 Fastest growing jobs and Task 8 Apprenticeship			

Computer Science	Year 10 – Half Term 5		
Topic	Content	Formative Assessments?	Link(s) to an example lesson

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Issues and Impact continued and Programming with arrays	Intellectual property, copyright Programming: 2D Arrays	Mini whiteboards Bell work recap questions Home learning quizzes End of topic test	https://classroom.thenational.academy/lessons/planning-your-digital-media-artefact-6gt32e https://classroom.thenational.academy/lessons/the-law-data-protection-and-copyright-61hked?from_query=copyright https://classroom.thenational.academy/lessons/2d-arrays-and-lists-cnj3ar
	Cyber security – malware and social engineering Programming: 2D arrays		https://classroom.thenational.academy/units/security-a5e3
	Technical vulnerabilities Programming: 2D arrays and formatting		https://classroom.thenational.academy/lessons/2d-arrays-and-lists-cnj3ar
	Encryption Programming: 2D arrays and formatting		https://classroom.thenational.academy/lessons/2d-arrays-and-lists-cnj3ar
	Acceptable use policies and backup procedures Programming: 2D arrays and formatting		https://classroom.thenational.academy/lessons/2d-lists-challenge-6rrpcd?from_query=2d+arrays+
	6 mark exam questions		
	Programming practice		
	Recap		
	Programming practice		
	Key Words: animation, design, resources		
Careers Focus :Task 9 Data analyst vs Data Scientist			

Summative Assessment:

Pupil End of Year Assessments will take place at the start of half term 6. These will cover all content taught in the first 5 half terms. This assessment will inform pupil Rank Order in the subject. As well as the content listed below, there is an expectation that staff will work with pupils to improve knowledge in areas of weakness identified in the summative assessments. This may include in school and out of school intervention, and collaborative and independent study.

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Computer Science	Year 10 – Half Term 6			
Topic	Content	Formative Assessments?	Link(s) to an example lesson	
Flowcharts and Programming with text files	The purpose of algorithms Drawing flowcharts	Mini whiteboards Bell work recap questions Home learning quizzes	https://classroom.thenational.academy/lessons/flowcharts-cct3gt?from_query=flowcharts	
	Reading text files Drawing flowcharts		https://classroom.thenational.academy/lessons/reading-text-files-70vp4d?from_query=programming+text+files	
	Reading text files Reading flowcharts		https://classroom.thenational.academy/lessons/trace-tables-crtpar?from_query=trace+tables	
	Reading text files Reading flowcharts Programming with flowcharts		https://classroom.thenational.academy/lessons/writing-to-text-files-6nhp6r?from_query=programming+text+files	
	Writing to text files Programming with flowcharts			
	Writing to text files Flowchart practice			
	Text files practice			
	Key Words: read, write, text file, comma separated, strip, split, records, fields			
	Careers Task 10 Digital Marketing			