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Northampton International Academy
Computer Science Curriculum Map

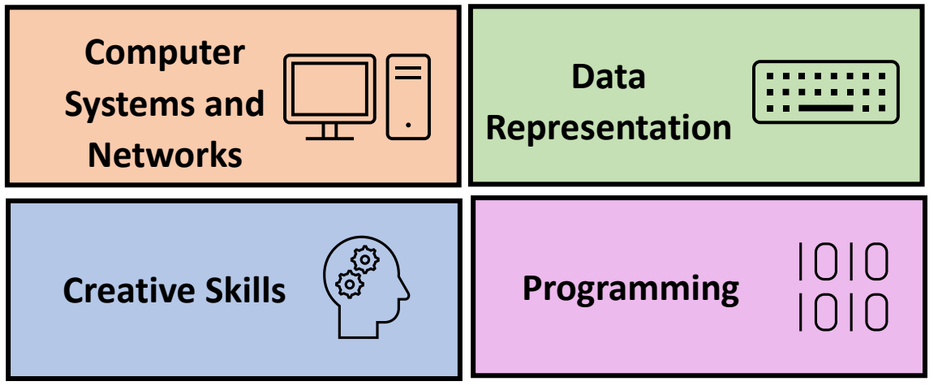
Why Teach Computer Science?

We believe that Computer Science is a vital subject for pupils to learn within the modern world, where computing and technology are embedded in everyday life. By learning Computer Science learners will study: -

- How computers work
- How to use key programs to present and share work
- How they are programmed
- How to recognise online dangers and stay safe within the online world
- Understand how digital technology is vital for modern careers
- Computational thinking and problem-solving skills they can use in many areas
- Understand the impact ethical, morally, socially and environmentally and the laws which are in place to protect intellectual property and society

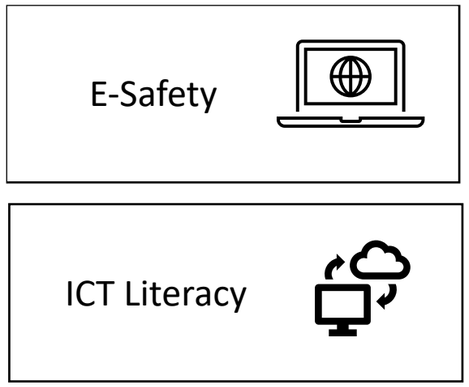
The 4 Big Ideas of the Computer Science Curriculum

Curriculum maps detail the sequencing of substantive knowledge from Computer Science to enable pupils to build schemata of important concepts over time through 4 'big ideas'.



Developing Disciplinary Knowledge

Within Computer Science we develop learner's disciplinary knowledge by the following techniques to help build their ability to fully apply the substantive knowledge.



Learning for Life and Careers

Employability skills

Learning to program builds characteristics such as collaboration, communication, creativity, critical thinking and resilience. Additionally, this subject develops numeracy and literacy, problem solving, and the ability to analyse and evaluate.

Linking the curriculum to careers

Careers in computing, engineering, IT, data management and security.

Examples of qualification pathways

At KS4 we offer GSCE Computer Science and at KS5 we offer A level Computer Science. The Computer Science GCSE progresses naturally to the Computer Science A level or Professional qualifications such as CCNA, which in turn can lead to further study at degree level.

East Midlands Academy Trust

Mapping the Big Ideas through the curriculum

	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Computer Systems and Networks	How to be safe online and ensure personal security of online information How to use common programmes such as Excel and PowerPoint effectively How networks and the internet interact	How to analyse and use websites effectively and ensure that they are credible How to design a website that is fit for purpose for the function it is needed	How to analyse the security aspects of a network and analyse the cybersecurity How physical hardware and software interact within a computer system	How computers work and store data within physical systems and hardware How to use and present information in effective ways to show ideas How to use binary and other computer languages	How to design secure networks which are fit for purpose How to evaluate different types of software and their uses How to use computers ethically	How to explain the functions of software and hardware How to think computationally to use different functions and analyse programmes How the software design process works	How operating systems work and link to programs they support How to create secure effective networks that link to internet usage How computer usage links to legislation and ethical considerations
Data Representation	How to use Excel to make basic calculations and present data in an effective way	N/A	How to present and manipulate data to use it effectively for a cause	How to use pseudo codes and algorithms to manipulate date to allow its effective analysis	How to store, manipulate and store data to make it useful and fit for purpose How to use SQL to enhance data and databases to allow them to perform add on functions	How to identify and use different data types effectively How to effectively use complex data functions to make the data more useful using computational logic	How to develop different types of database and understand the uses of each type How to create data exchange systems How to evaluate the use of complex algorithms and logic functions
Creative Skills	How to present documents on word and use additional media to improve the message that is being conveyed	How to manipulate media to increase its effectiveness when conveying a message	How to create and manipulate images, to make them more useful, such as animating and rendering them How to create sounds to use within media	This is covered within the Media curriculum			
Programming	How to program using Scratch to preform basic and complex functions	How to program using python to create simple algorithms to undertake simple functions Use event programming to create a mobile phone app	How to program using python to perform iterations and operations	How to use python as a programming language to program functions and algorithms that are fit for purpose and alter them to ensure they work	How to use python and SQL to create functions such as sorting and searching databases How to develop computational thinking to find errors in programmed algorithms	How to use Java and assembly basics to create effective programs that have a specific function that show a selection of different enhanced programming techniques	How to use complex programming language of JavaScript and SQL How to create a project to consolidate the programming techniques learnt over KS5

Northampton International Academy
Substantive Curriculum Content Overview

	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Autumn 1	Collaborating online respectfully	Vector Graphics	Python with sequences	Systems Architecture	Networks and Network security	Components of a CPU Computational Thinking	Systems Software Programming Project
Autumn 2	Networks from Semaphores – Computer networks	Computer Systems	Animation	Memory and Storage	Programming Languages and IDEs	Data Types Software Development	Exchanging Data Programming Project
Spring 1	Gaining support for a cause – Office and creative commons	Developing for the web	Representation – Going visual	Boolean Logic	Producing Robust Programs	Data Structures Programming Techniques	Networks and web technologies Programming Project
Spring 2	Programming essentials Scratch Part 1	Representations - from clay to silicon	Data Science	Systems Software	Ethical, Legal, Cultural and Environmental	Data and Boolean Algebra Algorithms	Legal, Moral, Ethical and Cultural issues Revision
Summer 1	Modelling data	Mobile App Development	Cybersecurity.	Algorithms	Revision	Boolean Algebra Mini Programming Project	*Revision*
Summer 2	Programming essentials Scratch Part 2	Python programming	Representation – Going Audio	Programming fundamentals	*N/A*	Revision Programming Project	*Revision and exams*