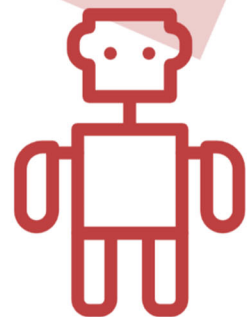




A parent/carer guide to Computer Science

Key Stage 3



2021-2022

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Our curriculum intent

The vision: *‘To investigate, experiment and discover a world of possibilities.’* A vision which tries to encompass a belief that the departmental aim is to encourage students to become creative problem solvers. To do this the department tries to embed a skill set of independence and perseverance which will enable students to confidently use their skills and knowledge to be able to identify a problem, plan and develop a solution and market it to an audience.

What we study in Key Stage 3

Topic Summary

Year 7

Topic/Time Frame	Unit
Unit 1 – autumn 1	Impact of technology (Collaborating online respectfully)
Unit 2 – autumn 2	Micro-bit – Sensing
Unit 3 – spring 1	Using media to gain support (Gaining support for a cause)
Unit 4 – spring 2	Introduction to Web (Transition unit – covering HTML and Tables)
Unit 5 – summer 1	Introduction to Scratch 1
Unit 6 – summer 2	Flowol – Algorithms 1

Year 8

Topic/Time Frame	Unit
Unit 1 – autumn 1	Scratch 2 (Block programming)
Unit 2 – autumn 2	Networks
Unit 3 – spring 1	Developing for the web including learning JavaScript(forms)
Unit 4 – spring 2	
Unit 5 – summer 1	Computing Systems
Unit 6 – summer 2	Flowol – Algorithms 2

Year 9

Topic/Time Frame	Unit
Unit 1 – autumn 1	Intro to Python
Unit 2 – autumn 2	Representations
Unit 3 – spring 1	Mobile app development
Unit 4 – spring 2	Mobile app development
Unit 5 – summer 1	Cybersecurity
Unit 6 – summer 2	Data Science

Why do we study these topics?

We have worked to develop an engaging, practical curriculum that is designed to challenge and support students' development in equal measure.

Units are designed to build on each other, embedding key skills through scenario-based learning.

National Curriculum mapping

On the following pages you can see how each of our units are mapped to the national curriculum.

Key:

Statement Number	National Curriculum Statement
3.1	design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems
3.2	understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem
3.3	use 2 or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions
3.4	understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]
3.5	understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems
3.6	understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits
3.7	undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users
3.8	create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability
3.9	understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct, and know how to report concerns

Year 7 units of study

Below you can see the teaching order for the Year 7 curriculum, along with the learning objectives and reference to how each unit is linked to the national curriculum programme of study for computer science.

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Impact of technology – Collaborating online respectfully	1	- Create a memorable and secure password for an account on the school network									
Impact of technology – Collaborating online respectfully	1	- Remember the rules of the computing lab									
Impact of technology – Collaborating online respectfully	2	- Find personal documents and common applications									
Impact of technology – Collaborating online respectfully	2	- Recognise a respectful email									
Impact of technology – Collaborating online respectfully	2	- Construct an effective email and send it to the correct recipients									
Impact of technology – Collaborating online respectfully	3	- Describe how to communicate with peers online									
Impact of technology – Collaborating online respectfully	4	- Plan effective presentations for a given audience									
Impact of technology – Collaborating online respectfully	4	- Describe cyberbullying									
Impact of technology – Collaborating online respectfully	4	- Explain the effects of cyberbullying									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Impact of technology – Collaborating online respectfully	5	- Plan effective presentations for a given audience									
Impact of technology – Collaborating online respectfully	5	- Describe cyberbullying									
Impact of technology – Collaborating online respectfully	5	- Explain the effects of cyberbullying									
Impact of technology – Collaborating online respectfully	6	- Check who you are talking to online									
Using media – Gaining support for a cause	1	- Select the most appropriate software to use to complete a task									
Using media – Gaining support for a cause	1	- Identify the key features of a word processor									
Using media – Gaining support for a cause	1	- Apply the key features of a word processor to format a document									
Using media – Gaining support for a cause	1	- Evaluate formatting techniques to understand why we format documents									
Using media – Gaining support for a cause	2	- Select appropriate images for a given context									
Using media – Gaining support for a cause	2	- Apply appropriate formatting techniques									
Using media – Gaining support for a cause	2	- Demonstrate an understanding of licensing issues involving online content by applying appropriate Creative Commons licences									
Using media – Gaining support for a cause	2	- Demonstrate the ability to credit the original source of an image									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Using media – Gaining support for a cause	3	- Critique digital content for credibility									
Using media – Gaining support for a cause	3	- Apply techniques in order to identify whether or not a source is credible									
Using media – Gaining support for a cause	4	- Apply referencing techniques and understand the concept of plagiarism									
Using media – Gaining support for a cause	4	- Evaluate online sources for use in own work									
Using media – Gaining support for a cause	5	- Construct a blog using appropriate software									
Using media – Gaining support for a cause	5	- Organise the content of the blog based on credible sources									
Using media – Gaining support for a cause	5	- Apply referencing techniques that credit authors appropriately									
Using media – Gaining support for a cause	5	- Design the layout of the content to make it suitable for the audience									
Using media – Gaining support for a cause	6	- Construct a blog using appropriate software									
Using media – Gaining support for a cause	6	- Organise the content of blog based on credible sources									
Using media – Gaining support for a cause	6	- Apply referencing techniques that credit authors appropriately									
Using media – Gaining support for a cause	6	- Design the layout of the content to make it suitable for the audience									
Programming essentials in Scratch – part I	2	- Recognise that computers follow the control flow of input/process/output									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Programming essentials in Scratch – part I	2	- Predict the outcome of a simple sequence that includes variables									
Programming essentials in Scratch – part I	2	- Trace the values of variables within a sequence									
Programming essentials in Scratch – part I	2	- Make a sequence that includes a variable									
Programming essentials in Scratch – part I	3	- Define a condition as an expression that will be evaluated as either true or									
Programming essentials in Scratch – part I	3	- Identify that selection uses conditions to control the flow of a sequence									
Programming essentials in Scratch – part I	3	- Identify where selection statements can be used in a program									
Programming essentials in Scratch – part I	3	- Modify a program to include selection									
Programming essentials in Scratch – part I	4	- Create conditions that use comparison operators (>,<,<=)									
Programming essentials in Scratch – part I	4	- Create conditions that use logic operators (and/or/not)									
Programming essentials in Scratch – part I	4	- Identify where selection statements can be used in a program that include comparison and logical operators									
Programming essentials in Scratch – part I	5	- Define iteration as a group of instructions that are repeatedly executed									
Programming essentials in Scratch – part I	5	- Describe the need for iteration									
Programming essentials in Scratch – part I	5	- Identify where count-controlled iteration can be used in a program									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Programming essentials in Scratch – part I	5	- Implement count-controlled iteration in a program									
Programming essentials in Scratch – part I	5	- Detect and correct errors in a program (debugging)									
Programming essentials in Scratch – part I	6	- Independently design and apply programming constructs to solve a problem (subroutine, selection, count-controlled iteration, operators, and variables)									

Year 8 units of study

Below you can see the teaching order for the Year 8 curriculum, along with the learning objectives and reference to how each unit is linked to the national curriculum programme of study for computer science.

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Programming essentials in Scratch – part II	7* note these lessons build on Y7 programming	- Define a subroutine as a group of instructions that will run when called by the main program or other subroutines									
Programming essentials in Scratch – part II	7	- Define decomposition as breaking a problem down into smaller, more manageable subproblems									
Programming essentials in Scratch – part II	7	- Identify how subroutines can be used for decomposition									
Programming essentials in Scratch – part II	8	- Identify where condition-controlled iteration can be used in a program									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Programming essentials in Scratch – part II	8	- Implement condition-controlled iteration in a program									
Programming essentials in Scratch – part II	9	- Evaluate which type of iteration is required in a program									
Programming essentials in Scratch – part II	10	- Define a list as a collection of related elements that are referred to by a single name									
Programming essentials in Scratch – part II	10	- Describe the need for lists									
Programming essentials in Scratch – part II	10	- Identify when lists can be used in a program									
Programming essentials in Scratch – part II	10	- Use a list									
Programming essentials in Scratch – part II	11	- Decompose a larger problem into smaller subproblems									
Programming essentials in Scratch – part II	11	- Apply appropriate constructs to solve a problem									
Programming essentials in Scratch – part II	12	- Decompose a larger problem into smaller subproblems									
Programming essentials in Scratch – part II	12	- Apply appropriate constructs to solve a problem									
Networks from semaphores to the Internet	1	- Define what a computer network is and explain how data is transmitted between computers across networks									
Networks from semaphores	1	- Define 'protocol' and provide									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
to the Internet		examples of non-networking protocols									
Networks from semaphores to the Internet	2	- List examples of the hardware necessary for connecting devices to networks									
Networks from semaphores to the Internet	3	- Compare wired to wireless connections and list examples of specific technologies currently used to implement such connections									
Networks from semaphores to the Internet	3	- Define 'bandwidth', using the appropriate units for measuring the rate at which data is transmitted, and discuss familiar examples where bandwidth is important									
Networks from semaphores to the Internet	4	- Define what the internet is									
Networks from semaphores to the Internet	4	- Explain how data travels between computers across the internet									
Networks from semaphores to the Internet	4	- Describe key words such as 'protocols', 'packets', and 'addressing'									
Networks from semaphores to the Internet	5	- Explain the difference between the internet, its services, and the World Wide Web									
Networks from semaphores to the Internet	5	- Describe how services are provided over the internet									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Networks from semaphores to the Internet	5	- List some of these services and the context in which they are used									
Networks from semaphores to the Internet	5	- Explain the term 'connectivity' as the capacity for connected devices ('Internet of Things') to collect and share information about me with or without my knowledge (including microphones, cameras, and geolocation)									
Networks from semaphores to the Internet	5	- Describe how internet-connected devices can affect me									
Networks from semaphores to the Internet	6	- Describe components (servers, browsers, pages, HTTP and HTTPS protocols, etc.) and how they work together									
Developing for the web	1	- Describe what HTML is									
Developing for the web	1	- Use HTML to structure static web pages									
Developing for the web	1	- Modify HTML tags using inline styling to improve the appearance of web pages									
Developing for the web	2	- Display images within a web page									
Developing for the web	2	- Apply HTML tags to construct a web page structure from a provided design									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Developing for the web	3	- Describe what CSS is									
Developing for the web	3	- Use CSS to style static web pages									
Developing for the web	3	- Assess the benefits of using CSS to style pages instead of in-line formatting									
Developing for the web	4	- Describe what a search engine is									
Developing for the web	4	- Explain how search engines 'crawl' through the World Wide Web and how they select and rank results									
Developing for the web	4	- Analyse how search engines select and rank results when searches are made									
Developing for the web	5	- Use search technologies effectively									
Developing for the web	5	- Discuss the impact of search technologies and the issues that arise by the way they function and the way they are used									
Developing for the web	5	- Create hyperlinks to allow users to navigate between multiple web pages									
Developing for the web	6	- Implement navigation to complete a functioning website									
Developing for the web	6	- Complete summative assessment									
Computing systems	1	- Recall that a general-purpose computing									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
		system is a device for executing programs									
Computing systems	1	- Recall that a program is a sequence of instructions that specify operations that are to be performed on data									
Computing systems	1	- Explain the difference between a general-purpose computing system and a purpose-built device									
Computing systems	2	- Describe the function of the hardware components used in computing systems									
Computing systems	2	- Describe how the hardware components used in computing systems work together in order to execute programs									
Computing systems	2	- Recall that all computing systems, regardless of form, have a similar structure ('architecture')									
Computing systems	3	- Analyse how the hardware components used in computing systems work together in order to execute programs									
Computing systems	3	- Define what an operating system is, and recall its role in controlling									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
		program execution									
Computing systems	4	- Describe the NOT, AND, and OR logical operators, and how they are used to form logical expressions									
Computing systems	4	- Use logic gates to construct logic circuits, and associate these with logical operators and expressions									
Computing systems	4	- Describe how hardware is built out of increasingly complex logic circuits									
Computing systems	4	- Recall that, since hardware is built out of logic circuits, data and instructions alike need to be represented using binary digits									
Computing systems	5	- Provide broad definitions of 'artificial intelligence' and 'machine learning'									
Computing systems	5	- Identify examples of artificial intelligence and machine learning in the real world									
Computing systems	5	- Describe the steps involved in training machines to perform tasks (gathering data, training, testing)									
Computing systems	5	- Describe how machine learning differs from traditional programming									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Computing systems	5	- Associate the use of artificial intelligence with moral dilemmas									
Computing systems	6	- Explain the implications of sharing program code									

Year 9 units of study

Below you can see the teaching order for the Year 9 curriculum, along with the learning objectives and reference to how each unit is linked to the national curriculum programme of study for computer science.

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Introduction to Python programming	2	- Describe the semantics of assignment statements									
Introduction to Python programming	2	- Use simple arithmetic expressions in assignment statements to calculate values									
Introduction to Python programming	2	- Receive input from the keyboard and convert it to a numerical value									
Introduction to Python programming	3	- Use relational operators to form logical expressions									
Introduction to Python programming	3	- Use binary selection (if, else statements) to control the flow of program execution									
Introduction to Python programming	3	- Generate and use random integers									
Introduction to Python programming	4	- Use multi-branch selection (if, elif, else statements) to control the flow of program execution									
Introduction to Python programming	4	- Describe how iteration (while statements) controls the flow of program execution									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Introduction to Python programming	5	- Use iteration (while loops) to control the flow of program execution									
Introduction to Python programming	5	- Use variables as counters in iterative programs									
Introduction to Python programming	6	- Combine iteration and selection to control the flow of program execution									
Introduction to Python programming	6	- Use Boolean variables as flags									
Representations – from clay to silicon	1	- List examples of representations									
Representations – from clay to silicon	1	- Recall that representations are used to store, communicate, and process information									
Representations – from clay to silicon	1	- Provide examples of how different representations are appropriate for different tasks									
Representations – from clay to silicon	2	- Recall that characters can be represented as sequences of symbols and list examples of character coding schemes									
Representations – from clay to silicon	2	- Measure the length of a representation as the number of symbols that it contains									
Representations – from clay to silicon	2	- Provide examples of how symbols are carried on physical media									
Representations – from clay to silicon	3	- Explain what binary digits (bits) are, in terms of familiar symbols such as digits or letters									
Representations – from clay to silicon	3	- Measure the size or length of a sequence of bits as the number of									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
		binary digits that it contains									
Representations – from clay to silicon	4	- Describe how natural numbers are represented as sequences of binary digits									
Representations – from clay to silicon	4	- Convert a decimal number to binary and vice versa									
Representations – from clay to silicon	5	- Convert between different units and multiples of representation size									
Representations – from clay to silicon	5	- Provide examples of the different ways that binary digits are physically represented in digital devices									
Representations – from clay to silicon	6	- Apply all of the skills covered in this unit									
Mobile app development	1	- Identify when a problem needs to be broken down									
Mobile app development	1	- Implement and customise GUI elements to meet the needs of the user									
Mobile app development	2	- Recognise that events can control the flow of a program									
Mobile app development	2	- Use user input in an event-driven programming environment									
Mobile app development	2	- Use variables in an event-driven programming environment									
Mobile app development	2	- Develop a partially complete application to include additional functionality									
Mobile app development	3	- Identify and fix common coding errors									
Mobile app development	3	- Pass the value of a variable into an object									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Mobile app development	3	- Establish user needs when completing a creative project									
Mobile app development	4	- Apply decomposition to break down a large problem into more manageable steps									
Mobile app development	4	- Use user input in a block-based programming language									
Mobile app development	4	- Use a block-based programming language to create a sequence									
Mobile app development	4	- Use variables in a block-based programming language									
Mobile app development	5	- Use a block-based programming language to include sequencing and selection									
Mobile app development	5	- Use user input in a block-based programming language									
Mobile app development	5	- Use variables in a block-based programming language									
Mobile app development	5	- Reflect and react to user feedback									
Mobile app development	6	- Use a block-based programming language to include sequencing and selection									
Mobile app development	6	- Use user input in a block-based programming language									
Mobile app development	6	- Use variables in a block-based programming language									
Mobile app development	6	- Evaluate the success of the programming project									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Cybersecurity	1	- Explain the difference between data and information									
Cybersecurity	1	- Critique online services in relation to data privacy									
Cybersecurity	1	- Identify what happens to data entered online									
Cybersecurity	1	- Explain the need for the Data Protection Act									
Cybersecurity	2	- Recognise how human errors pose security risks to data									
Cybersecurity	2	- Implement strategies to minimise the risk of data being compromised through human error									
Cybersecurity	3	- Define hacking in the context of cyber security									
Cybersecurity	3	- Explain how a DDoS attack can impact users of online services									
Cybersecurity	3	- Identify strategies to reduce the chance of a brute force attack being successful									
Cybersecurity	3	- Explain the need for the Computer Misuse Act									
Cybersecurity	4	- List the common malware threats									
Cybersecurity	4	- Examine how different types of malware causes problems for computer systems									
Cybersecurity	4	- Question how malicious bots can have an impact on societal issues									
Cybersecurity	5	- Compare security threats against probability and the									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
		potential impact to organisations									
Cybersecurity	5	- Explain how networks can be protected from common security threats									
Cybersecurity	6	- Identify the most effective methods to prevent cyberattacks									
Data science	1	- Define data science									
Data science	1	- Explain how visualising data can help identify patterns and trends in order to help us gain insights									
Data science	1	- Use an appropriate software tool to visualise data sets and look for patterns or trends									
Data science	2	- Recognise examples of where large data sets are used in daily life									
Data science	2	- Select criteria and use data set to investigate predictions									
Data science	2	- Evaluate findings to support arguments for or against a prediction									
Data science	3	- Define the terms 'correlation' and 'outliers' in relation to data trends									
Data science	3	- Identify the steps of the investigative cycle									
Data science	3	- Solve a problem by implementing steps of the investigative cycle on a data set									
Data science	3	- Use findings to support a recommendation									

Unit Name	Lesson	Learning Objectives	National Curriculum Links								
			3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Data science	4	- Identify the steps of the investigative cycle									
Data science	4	- Identify the data needed to answer a question defined by the learner									
Data science	4	- Create a data capture form									
Data science	5	- Describe the need for data cleansing									
Data science	5	- Apply data cleansing techniques to a data set									
Data science	5	- Visualise a data set									
Data science	6	- Visualise a data set									
Data science	6	- Analyse visualisations to identify patterns, trends, and outliers									
Data science	6	- Draw conclusions and report findings									

How do we assess students work?

In each unit of work we check students progress through practical projects and a short topic test.

Homework

Homework is based on learning and using the key vocabulary for each unit. Students are asked to learn the vocabulary (key word and meaning) and then apply those words into a scenario/key question.

How do students evidence their work?

All work is submitted electronically via Microsoft Teams and their digital exercise book. Students are not required to print work out on paper (unless it is for a display).

Can my son/daughter access his/her work at home?

Students can access their digital exercise book via Microsoft Teams. They should download and install the app (to a PC/Mac, tablet, or mobile phone). Once the app is installed, they can login via their school email address and password. They will then be able to access all the resources that they have access to in school, at home.

How does my child prepare for tests?

Within each unit of study, students will receive a short end of topic test to complete. They can prepare for this assessment by using the topic knowledge organsier file (which covers all the key concepts of the unit on an A3 page), practicing the key vocabulary (which they will cover as part of

class and homework activities) and going over the activities/notes that they have created in lesson in their digital exercise books/Teams.