

# Computing

## Curriculum intent:

Computing at Dormston aims to provide pupils with the skills and knowledge for an ever-evolving Digital future. It is an innovative subject designed to challenge and inspire pupils to think logically, critically, and creatively to solve problems. The curriculum is designed carefully to provide a balance of academic and practical elements to empower pupils to become motivated, independent learners. Computing is not just about ensuring pupils achieve academic success, but also building strong transferrable skills essential to world where digital literacy is crucial. Click on our learning journey below for an overview of what pupils will study in Computing.



Learning journey  
2021 onwards.pdf

## KS3 Curriculum

The curriculum is designed around the 3 main areas of **Digital Literacy**, **Information Technology** and **Computer Science**. Within these areas the following stands are covered: Networks, Creating Media, Data and Information, Design and Development, Computing Systems, Impact of Technology, Algorithms, Programming, Effective use of Tools and Safety and Security. Each year, these strands are built upon to help reinforce learning. Click on our Rainbow roadmap below to see how our units are linked together in KS3.



Computing Rainbow  
Roadmap.pdf

The department boasts 3 dedicated classrooms each with 32 computers. The school benefits from having 2 full time network managers who keep the system operational and up to date with the latest software to support learning.

An after school digital creators club lets pupils experiment with all different aspects of computing. Whilst mainly focussed on developing pupils' love of, and ability to program, the club also gets pupils looking at different types of computer systems (raspberry pi, retro computers) as well as game design and creation.

## GCSE Curriculum

Pupils who choose to study Computer Science at GCSE will build upon the skills and knowledge developed in Years 7,8 and 9. As pupils have been following the 5-year curriculum, the transition to GCSE from KS3 will be seamless. More challenge and GCSE aspects has been introduced at an earlier stage that helps our pupils prepare for their Computer Science qualification.

Exam Board: OCR GCSE (9-1) Computer Science (J277)

Outline of the Course:

GCSE Computer Science is a challenging and practical subject where learners can apply the knowledge and skills learned in the classroom to solve real-world problems. It is an intensely creative subject that involves invention and excitement. The OCR Computer Science qualification will value computational thinking, helping learners to develop the skills to solve problems and design systems that do so. This GCSE is ideally suited to pupils who have a keen interest in computing, how computers work and enjoy programming. Pupils need to be dedicated, hardworking and keen to challenge themselves.

**Literacy/Reading/Oracy opportunities:**

**Recommended Reading:**

“Ready Player One” – Ernest Cline

“Black Flag” – Matt Langley

“Computational Fairy Tales” – Jeremy Kubica

[“GCSE Computer Science OCR Revision Guide - for exams in 2022 and beyond” - CGP](#)

**Recommended Viewing:**

“Wargames” – Film

“The Imitation Game” – Film

[BBC Click](#) - A comprehensive guide to all the latest gadgets, websites, games and computer industry news.

Curriculum rationale Year 7 - 11	Autumn	Spring	Summer
Year 7	<p><b>“Collaborating online respectfully”:</b> This unit has been designed to ensure that learners are given sufficient time to familiarise themselves with the school network. It also allows the teacher to discuss appropriate use of the school network, and to update and remind</p>	<p><b>“Modelling data”:</b> The spreadsheet unit for Year 7 takes learners from having very little knowledge of spreadsheets to being able to confidently model data with a spreadsheet. The unit uses engaging activities to progress learners from using basic formulas to writing</p>	<p><b>“Programming Essentials in Scratch Part 1”:</b> This unit is the first programming unit of KS3. The aim of this unit and the following unit (‘programming 2’) is to build learners’ confidence and knowledge of the key programming constructs. Importantly,</p>

learners of important online safety issues. Whilst completing this unit, learners will also learn how to use presentation software effectively. In terms of online safety, this unit focuses on respecting others online, spotting strangers, and the effects of cyberbullying.

**“Gaining Support for a Cause”:** During this unit, learners develop their understanding of information technology and digital literacy skills. They will use the skills learnt across the unit to create a blog post about a real-world cause that they would like to gain support for. Learners will develop software formatting skills and explore concerns surrounding the use of other people’s work, including licensing and legal issues.

their own COUNTIF statements. This unit will give learners a good set of skills that they can use in computing lessons and in other subject areas.

**“Networks: from semaphores to the internet”:** This unit begins by defining a network and addressing the benefits of networking, before covering how data is transmitted across networks using protocols. The types of hardware required are explained, as is wired and wireless data transmission. Learners will develop an understanding of the terms ‘internet’ and ‘World Wide Web’, and of the key services and protocols used. Practical exercises are included throughout to help strengthen understanding.

this unit does not assume any previous programming experience, but it does offer learners the opportunity to expand on their knowledge throughout the unit.

**Why?**

**Collaborating online respectfully:**

- Supporting core value of **Respect**
- Pupils become **responsible** by managing new platforms for their learning (school network, Go4schools, email, Teams)
- Building upon prior **knowledge** (cyberbullying) and skills (PowerPoint) learnt at primary school

**Gaining Support for a Cause:**

- Developing IT skills by introducing unfamiliar software

**Modelling Data:**

- Developing IT skills by introducing industry standard software - Microsoft Excel – builds **resilience**
- Pupils develop IT skills that are transferable to other subject areas making learning **responsible**
- Introduces fundamental programming **knowledge** of selection which will be build upon in the programming unit in the summer term

**Programming Essentials in Scratch Part 1:**

- Programming is fundamental to Computing and is introduced at this stage as pupils are now **responsible** learners
- The problem solving nature of programming helps build pupils’ **resilience**
- Pupils enjoy the practical element of programming and this unit builds upon previous **knowledge** from primary school whilst preparing them for more

	<ul style="list-style-type: none"> <li>- Microsoft Sway – builds <b>resilience</b></li> <li>• Building upon researching skills – focusing on reliability of information and licencing – <b>Respecting</b> the rule of law</li> </ul>	<p><b>Networks: from semaphores to the internet:</b></p> <ul style="list-style-type: none"> <li>• As pupils are now part of an interconnected world, this unit introduces new <b>knowledge</b> of computer networks and how they work</li> <li>• This unit focuses on the Networks and Computer systems strands which are built upon early in Y8</li> </ul>	<p>complex concepts to be covered in Y8</p> <ul style="list-style-type: none"> <li>• Introduces programming fundamentals of sequence, selection and iteration essential to the computing curriculum and careers in programming and software development</li> </ul>
<b>How parents / carers can support</b>	<ul style="list-style-type: none"> <li>• Ensure pupils know how to access the school systems including RM Unify, Email, Teams and Go4Schools</li> <li>• Click below to access the Oak national Academy website for lessons that mirror the units covered in Computing <ul style="list-style-type: none"> <li>○ <a href="#">Collaborating Online Respectfully</a></li> <li>○ <a href="#">Gaining Support for a Cause</a></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Click below to access the Oak national Academy website for lessons that mirror the units covered in Computing <ul style="list-style-type: none"> <li>○ <a href="#">Modelling Data</a></li> <li>○ <a href="#">Networks</a></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Click below to access the Oak national Academy website for lessons that mirror the units covered in Computing <ul style="list-style-type: none"> <li>○ <a href="#">Programming Essentials</a></li> </ul> </li> <li>• Encourage pupils to experiment with programming by using the Scratch website and supporting tutorials <ul style="list-style-type: none"> <li>○ <a href="#">Scratch - Imagine, Program, Share (mit.edu)</a></li> </ul> </li> </ul>
	<b>Autumn</b>	<b>Spring</b>	<b>Summer</b>
<b>Year 8</b>	<p><b>“Computing Systems”:</b> This unit looks at the variety of different computing systems and how they work. Pupils will also learn about operating systems, computational logic, artificial intelligence, and open-source software.</p> <p><b>“Developing for the web”:</b> In this unit, learners will explore the technologies that make up the internet and World</p>	<p><b>“Representations – from Clay to Silicon”:</b> This unit conveys essential knowledge relating to binary representations. The activities gradually introduce learners to binary digits and how they can be used to represent text and numbers. The concepts are linked to practical applications and problems that the learners are familiar with.</p>	<p><b>“Mobile App Development”:</b> In a world where there is an app for every possible need, this unit aims to take the learners from designer to project manager to developer to create their own mobile app. Using App Lab from code.org, learners will familiarise themselves with the coding environment and have an opportunity to build on the programming concepts they used in</p>

	<p>Wide Web. Starting with an exploration of the building blocks of the World Wide Web, HTML, and CSS, learners will investigate how websites are catalogued and organised for effective retrieval using search engines. They will also consider the hidden network technologies that protect us from the threats that a connected world brings, as well as looking at the impact of these services and technologies.</p>	<p><b>“Introduction to Python Programming”</b>: This unit introduces learners to text-based programming with Python. The lessons form a journey that starts with simple programs involving input and output, and gradually moves on through arithmetic operations, randomness, selection, and iteration. Emphasis is placed on tackling common misconceptions and elucidating the mechanics of program execution.</p>	<p>previous units before undertaking their project.</p>
<p><b>Why?</b></p>	<p><b>Computing systems:</b></p> <ul style="list-style-type: none"> <li>Covers the Impact of Technology, Computing systems and programming essential strands, this unit builds <b>knowledge</b> of hardware and software used in Y7</li> </ul> <p><b>Developing for the Web:</b></p> <ul style="list-style-type: none"> <li>Practical unit builds upon <b>knowledge</b> of networks covered in Y7</li> <li>Building upon programming skills – builds <b>resilience</b> when writing code for websites</li> </ul>	<p><b>Representations – from clay to silicon:</b></p> <ul style="list-style-type: none"> <li>This mathematical unit introduces different thinking skills and concepts</li> <li>Pupils build fundamental <b>knowledge</b> of how data is stored as binary numbers in computer systems</li> </ul> <p><b>Introduction to Python Programming:</b></p> <ul style="list-style-type: none"> <li>This programming unit explicitly builds upon skills and <b>knowledge</b> gained from the programming essentials unit covered in Y7 plus the Developing for the Web during the Autumn term</li> <li>Introduces text-based programming using industry standard language – Python</li> <li>Continually builds <b>resilience</b> and problem solving skills</li> </ul>	<p><b>Mobile App Development:</b></p> <ul style="list-style-type: none"> <li>This practical unit engages learners by allowing to apply their programming skills and <b>knowledge</b> to a real-world relatable scenario.</li> <li>Again, builds problem-solving and <b>resilience</b> to ensure their app works as intended</li> </ul>

How parents / carers can support	<ul style="list-style-type: none"> <li>• Ensure pupils know how to access the school systems including RM Unify, Email, Teams and Go4Schools</li> <li>• Click below to access the Oak national Academy website for lessons that mirror the units covered in Computing               <ul style="list-style-type: none"> <li>○ <a href="#">Computing Systems</a></li> <li>○ <a href="#">Developing for the Web</a></li> </ul> </li> <li>• Encourage pupils to experiment with learning HTML               <ul style="list-style-type: none"> <li>○ <a href="#">HTML</a></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Click below to access the Oak national Academy website for lessons that mirror the units covered in Computing               <ul style="list-style-type: none"> <li>○ <a href="#">Representations</a></li> <li>○ <a href="#">Python Programming</a></li> </ul> </li> <li>• Encourage pupils to experiment with programming by using the supporting tutorial below               <ul style="list-style-type: none"> <li>○ <a href="#">Python</a></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Click below to access the Oak national Academy website for lessons that mirror the units covered in Computing               <ul style="list-style-type: none"> <li>○ <a href="#">Mobile App Development</a></li> </ul> </li> </ul>
	Autumn	Spring	Summer
Year 9	<p><b>“Cyber Security”</b>: This unit takes the learners on an eye-opening journey of discovery about techniques used by cybercriminals to steal data, disrupt systems, and infiltrate networks.</p> <p><b>“Data Science”</b>: In this unit, learners will be introduced to data science, and by the end of the unit they will be empowered by knowing how to use data to investigate problems and make changes to the world around them. Learners will be exposed to both global and local data sets and gain an understanding of how visualising data can help with the process of identifying patterns and trends.</p>	<p><b>“Python Programming 2”</b>: This unit introduces learners to how data can be represented and processed in sequences, such as lists and strings. The lessons cover a spectrum of operations on sequences of data, that range from accessing an individual element to manipulating the entire sequence.</p> <p><b>“Physical Computing”</b>: This unit applies and enhances the learners’ programming skills in a new engaging context: physical computing, using the BBC micro:bit.</p>	<p><b>“Media – Animations”</b>: In this unit learners will discover how professionals create 3D animations using the industry-standard software package, Blender. By completing this unit learners will gain a greater understanding of how this important creative field is used to make the media products that we consume.</p>
Why?	<p><b>Cyber Security:</b></p> <ul style="list-style-type: none"> <li>• Having already covered how networks work in Y7, then developing web pages in Y8,</li> </ul>	<p><b>Python Programming 2:</b></p> <ul style="list-style-type: none"> <li>• Explicitly builds upon skills and <b>knowledge</b> gained in Y7 and 8 programming units</li> </ul>	<p><b>Media - Animations:</b></p> <ul style="list-style-type: none"> <li>• Pupils learn professional, complex software – helps build <b>resilience</b></li> </ul>

	<p>this unit build <b>knowledge</b> on the risks associated with the internet</p> <ul style="list-style-type: none"> <li>Encourages pupils to be <b>responsible</b> and <b>respectful</b> when operating in an online environment, specifically adhering to the rule of law</li> </ul> <p><b>Data Science:</b></p> <ul style="list-style-type: none"> <li>Explicitly builds upon <b>knowledge</b> of spreadsheets covered in Y7</li> <li>Widens pupils awareness of “Big Data” on a local and global scale therefore building <b>respect</b></li> <li>Pupils become <b>responsible</b> in the use of data and how it needs to be accurate</li> </ul>	<ul style="list-style-type: none"> <li>Again, building pupils’ <b>resilience</b> when writing programs and problem solving.</li> <li>Encourages pupils to have a strong attention to detail</li> </ul> <p><b>Physical Computing:</b></p> <ul style="list-style-type: none"> <li>Pupils have now gained strong programming skills and this unit allows them to apply these to a scenario with actual physical results</li> <li>Builds problem solving skills and <b>resilience</b>.</li> <li>Fundamental programming concepts (sequence, selection, iteration) and <b>knowledge</b> become embedded through practise</li> </ul>	<ul style="list-style-type: none"> <li>Pupils have the ability to be creative with software</li> <li>Open up pupils awareness of potential digital career paths</li> </ul>
<b>How parents / carers can support</b>	<ul style="list-style-type: none"> <li>Ensure pupils know how to access the school systems including RM Unify, Email, Teams and Go4Schools</li> <li>Click below to access the Oak national Academy website for lessons that mirror the units covered in Computing <ul style="list-style-type: none"> <li><a href="#">Cyber Security</a></li> <li><a href="#">Data Science</a></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Click below to access the Oak national Academy website for lessons that mirror the units covered in Computing <ul style="list-style-type: none"> <li><a href="#">Python Programming 2</a></li> <li>Physical Computing</li> </ul> </li> <li>Encourage pupils to experiment with programming by using the supporting tutorial below <ul style="list-style-type: none"> <li><a href="#">Python</a></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Click below to access the Oak national Academy website for lessons that mirror the units covered in Computing <ul style="list-style-type: none"> <li><a href="#">Media – Animations</a></li> </ul> </li> <li>If possible, download and experiment with Blender software</li> </ul>
	<b>Autumn</b>	<b>Spring</b>	<b>Summer</b>
<b>Year 10</b>	<p><b>Systems Architecture</b></p> <ul style="list-style-type: none"> <li>Architecture of the CPU</li> <li>CPU Performance</li> <li>Embedded systems</li> </ul>	<p><b>Computer Networks, connections and protocols</b></p> <ul style="list-style-type: none"> <li>Networks and topologies</li> </ul>	<p><b>System software</b></p> <ul style="list-style-type: none"> <li>Operating Systems</li> <li>Utility Software</li> </ul>

	<p><b>Memory and Storage</b></p> <ul style="list-style-type: none"> <li>• Primary storage</li> <li>• Secondary storage</li> <li>• Units</li> <li>• Data storage</li> <li>• Compression</li> </ul>	<ul style="list-style-type: none"> <li>• Wired and wireless networks, protocols and layers</li> </ul> <p><b>Network security</b></p> <ul style="list-style-type: none"> <li>• Threats to computer systems and networks</li> <li>• Identifying and preventing vulnerabilities</li> </ul>	<p><b>Ethical, legal, cultural and environmental impacts of digital technology</b></p>
<p><b>Why?</b></p>	<p><b>Systems Architecture</b></p> <ul style="list-style-type: none"> <li>• Builds directly upon <b>knowledge</b> gained in KS3 (networks, computer systems, physical computing)</li> <li>• Introduces pupils to the GCSE course with familiar yet challenging concepts, building <b>responsibility</b> for learning</li> </ul> <p><b>Memory and Storage</b></p> <ul style="list-style-type: none"> <li>• Again, building upon <b>knowledge</b> gained in KS3 units and offering more challenge specifically using mathematical skills in binary and hexadecimal conversion, the use of binary numbers to represent data (covered in Y8)</li> </ul>	<p><b>Computer Networks, connections and protocols</b></p> <ul style="list-style-type: none"> <li>• Explicitly building upon <b>knowledge</b> gained in Y7 (Networks), Y8 (Developing for the web) and Y9 (Cyber Security), this unit further develops concept of computer networks and introduces protocols fundamental to allowing computers to communicate</li> </ul> <p><b>Network security</b></p> <ul style="list-style-type: none"> <li>• Building directly upon Y9 unit – Cyber Security</li> <li>• Pupils consolidate prior <b>knowledge</b> and challenge themselves to understand deeper concepts of network security</li> </ul>	<p><b>System software</b></p> <ul style="list-style-type: none"> <li>• Pupils introduced to the concept of software in Y7, then Operating Systems in Y8. In Y10 they explore this further and how the Operating System is fundamental to the functionality of a computer system</li> <li>• Utility Software is introduced in Y9 during the Cyber Security unit. In Y10 this is developed further to build <b>knowledge</b> of the software required to maintain a computer system</li> </ul>
<p><b>How parents / carers can support</b></p>	<p>The OCR GCSE Computer Science curriculum at Dormston follows a flipped learning model. This means that homework tasks involve pupils watching a video online then making effective Cornell notes. Links to the videos can be found below:</p> <p><a href="#">Systems Architecture</a>  <a href="#">Memory and Storage</a>  <a href="#">Computer Networks, Connections and Protocols</a>  <a href="#">Network Security</a></p>		



[System Software](#)

In addition to this, pupils can use the [BBC bitesize](#) website to revise topics

Full course material including past/practise exam papers can be accessed [here](#)

Finally, pupils are encouraged to continually practise programming using Python. One of many online tutorials can be found below

[Python](#)

	Autumn	Spring	Summer
<b>Year 11</b>	<b>Algorithms</b> <ul style="list-style-type: none"><li>• Computational Thinking</li><li>• Designing, creating and refining algorithms</li><li>• Searching and sorting algorithms</li></ul> <b>Programming fundamentals</b> <ul style="list-style-type: none"><li>• Programming fundamentals</li><li>• Data Types</li><li>• Additional Programming Techniques</li></ul> <b>Producing robust programs</b> <ul style="list-style-type: none"><li>• Defensive design</li><li>• Testing</li></ul>	<b>Boolean logic</b> <b>Programming languages and integrated development environments</b> <ul style="list-style-type: none"><li>• Languages</li><li>• The Integrated Development Environment (IDE)</li></ul>	Revision
<b>Why?</b>	<b>Algorithms</b> <ul style="list-style-type: none"><li>• Pupils have been introduced to algorithms and computational thinking throughout KS3 and this unit builds upon this <b>knowledge</b> and associated skills</li></ul>	<b>Boolean logic</b> <ul style="list-style-type: none"><li>• This unit builds upon concepts covered in Y8 which are reflected upon during all programming units.</li></ul>	

	<p><b>Programming fundamentals</b></p> <ul style="list-style-type: none"> <li>• By completing programming units in Y7,8 and 9, pupils have the foundation <b>knowledge</b> to build upon to write programs effectively</li> <li>• Pupils now have <b>resilience</b> to spot errors in their programs and fix these independently</li> <li>• This unit introduces additional programming techniques that require further <b>effort</b> in order to master</li> </ul> <p><b>Producing robust programs</b></p> <ul style="list-style-type: none"> <li>• By identifying potential threats (Y8, 9 and 10), pupils apply methods to ensure data in a program is robust and users are authenticated. Pupils need to ensure programs handle data <b>responsibly</b></li> </ul>	<ul style="list-style-type: none"> <li>• Reinforces <b>knowledge</b> on the basics of how a computer system operates using transistors and electrical circuits.</li> </ul> <p><b>Programming languages and integrated development environments</b></p> <ul style="list-style-type: none"> <li>• The final unit brings all of the programming concepts together to enable pupils to make links between the program they write and how they translate down to make a computer system perform an action</li> <li>• Pupils have used various IDEs since year 7 and so they can evaluate their use and how they are integral to programming</li> </ul>	
<p><b>How parents / carers can support</b></p>	<p>The OCR GCSE Computer Science curriculum at Dormston follows a flipped learning model. This means that homework tasks involve pupils watching a video online then making effective Cornell notes. Links to the videos can be found below:</p> <p><a href="#">Algorithms</a>  <a href="#">Programming Fundamentals</a>  <a href="#">Producing Robust Programs</a>  <a href="#">Boolean Logic</a>  <a href="#">Programming Languages and Integrated Development Environments</a></p> <p>Full course material including past/practise exam papers can be accessed <a href="#">here</a></p> <p>In addition to this, pupils can use the <a href="#">BBC bitesize</a> website to revise topics</p>		

Finally, pupils are encouraged to continually practise programming using Python. One of many online tutorials can be found below

[Python](#)