

The Computer Science department at OBA aims to give all KS3 students:

***Opportunities, knowledge and experience to access 21st century employability, by being a successful digital citizen and having an ambitious career choice***

As a department we are forward thinking and keen to develop our own skills, via regular CPD, to ensure that we can deliver a curriculum that is both exciting and relevant. Our curriculum has been sequenced so that all strands of the Computing National Curriculum are covered in depth, this prepares students with the skills needed to continue with Computer Science in KS4 and KS5. The KS3 programme of study is detailed below:

Term 1

<p>Subject: Computer Science</p> <p>Year 7</p>	<p>Curriculum Overview</p>	<p>Collaborating online respectfully - 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 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.</p> <p>Modelling data - 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 their own COUNTIF statements. This unit will give learners a good set of skills that they can use in computer science lessons and in other subject areas.</p>
	<p>Support Materials / Additional suggested activities</p>	<p>Year 7 computer science knowledge organiser</p> <p>Staying safe on the internet</p> <p><a href="http://www.ceop.co.uk">www.ceop.co.uk</a></p> <p>Modelling data</p>

	<a href="#">How spreadsheets work - Modelling with spreadsheets - GCSE ICT Revision - BBC Bitesize</a>
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<p>Subject: Computer Science</p> <p>Year 8</p>	<p>Curriculum Overview</p>	<p>Computing systems - This unit takes learners on a tour through the different layers of computing systems: from programs and the operating system, to the physical components that store and execute these programs, to the fundamental binary building blocks that these components consist of.</p> <p>The aim is to provide a concise overview of how computing systems operate, conveying the essentials and abstracting away the technical details that might confuse or put off learners.</p> <p>The last lessons cover two interesting contemporary topics: artificial intelligence and open source software. These are linked back to the content of the unit, helping learners to both broaden their knowledge and focus on the topics addressed in the unit.</p> <p>The unit assumes no prior knowledge. There are, however, links to the 'Representations' units taught in Years 8 and 9 and the 'Networks' units taught in Years 7 and 8.</p> <p>Developing for the web - In this unit, learners will explore the technologies that make up the internet and World 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. By the end of the unit, learners will have a functioning website.</p>
	<p>Support Materials / Additional</p>	<p>Year 8 computer science knowledge organiser</p>

	suggested activities	<p>Computer systems</p> <p><a href="#">Computer systems - Introducing computers - GCSE Computer Science Revision - BBC Bitesize</a></p> <p>Developing for the web</p> <p><a href="#">Web design and development - National 5 Computing Science Revision - BBC Bitesize</a></p>
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<p>Subject: Computer Science</p> <p>Year 9</p>	<p>Curriculum Overview</p>	<p>Cybersecurity - 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. The learners will start by considering the value of their data to organisations and what they might use it for. They will then look at social engineering techniques used by cybercriminals to try to trick users into giving away their personal data. The unit will look at the more common cybercrimes such as hacking, DDoS attacks, and malware, as well as looking at methods to protect ourselves and our networks against these attacks.</p> <p>Data science - 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. Towards the end of the unit, the learners will go through the steps of the investigative cycle to try to solve a problem in the school using data.</p>
	<p>Support Materials / Additional</p>	<p>Year 9 computer science knowledge organiser</p> <p>Cybersecurity</p>

	suggested activities	<p><a href="#">Cyber security - Ethical, legal and environmental impacts of digital technology - AQA - GCSE Computer Science Revision - AQA - BBC Bitesize</a></p> <p>Data science</p> <p><a href="#">Data representation - KS3 Computer Science - BBC Bitesize</a></p>
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Term 2

<p>Subject: Computer Science  Year 7</p>	<p>Curriculum Overview</p>	<p>Networks - Imagine a world without computer networks, and how different your life would be. There would be no more YouTube, Google, instant messaging, online video gaming, Netflix, and iTunes. There would be no online shopping, or quickly looking up directions to a location at the click of a button. There would be no more sharing of files or peripherals such as a printer, and no more central backups of information. As networks have evolved, society has become increasingly reliant on the services that they provide. They have changed the way we learn, work, play, and communicate. 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.</p> <p>Programming 1 - 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, this unit does not assume any previous programming experience, but it does offer learners the opportunity to expand on their knowledge throughout the unit.</p>
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		The main programming concepts covered in this unit are sequencing, variables, selection, and count-controlled iteration. All of the examples and activities for this unit use Scratch 3.
	Support Materials / Additional suggested activities	<p>Year 7 computer science knowledge organiser</p> <p>Networks</p> <p><a href="#">Networks - Networks - Edexcel - GCSE Computer Science Revision - Edexcel - BBC Bitesize</a></p> <p>Programming</p> <p><a href="#">Scratch - Imagine, Program, Share (mit.edu)</a></p>

Subject: Computer Science Year 8	Curriculum Overview	<p>Introduction to Python Programming - 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>A range of pedagogical tools are employed throughout the unit, with the most prominent being pair programming, live coding, and worked examples.</p> <p>Vector graphics - This unit offers students the opportunity to design graphics using vector graphic editing software. The lessons are tailored to <a href="#">Inkscape</a> (inkscape.org), which is open source and cross-platform, but the resources should be readily adaptable to any vector graphics editor.</p> <p>Vector graphics can be used to design anything from logos and icons to posters, board games, and complex illustrations. Through this unit, students will be able to better understand</p>
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		<p>the processes involved in creating such graphics and will be provided with the knowledge and tools to create their own.</p> <p>One of the most interesting and challenging aspects of creating vector graphics is their unlikely link to computational thinking. Creating a complex design is a multi-step process that starts with elementary shapes and involves combining them into more intricate ones using operations such as union, difference, and intersection. There are usually multiple paths to achieving the goal and the process involves decomposition, evaluation, and plenty of inventiveness!</p>
	<p>Support Materials / Additional suggested activities</p>	<p>Year 8 computer science knowledge organiser</p> <p>Introduction to Python Programming</p> <p><a href="#">Welcome to Python.org</a></p> <p>Vector graphics</p> <p><a href="#">Draw Freely   Inkscape</a></p>

<p>Subject: Computer Science  Year 9</p>	<p>Curriculum Overview</p>	<p>Animation - Films, television, computer games, advertising, and architecture have been revolutionised by computer-based 3D modelling and animation. 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. Sessions will take learners through the basics of modelling, texturing, and animating; outputs will include 3D models, short videos, and VR. Links are made throughout to computer science, computational thinking, and</p>
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		<p>the world of work. Tools and techniques learnt in this unit can also be used for 3D printing.</p> <p>Physical computing - This unit applies and enhances the learners' programming skills in a new engaging context: physical computing, using the BBC micro: bit.</p> <p>In the first half of the unit, learners will get acquainted with the host of components built into the micro:bit, and write simple programs that use these components to interact with the physical world. In the process, they will refresh their Python programming skills and encounter a range of programming patterns that arise frequently in physical computing applications.</p> <p>In the second half, learners will work in pairs to build a physical computing project. They will be required to select and design their project purposefully, apply what they have learnt by building a prototype, and keep a structured diary throughout the process.</p>
	Support Materials / Additional suggested activities	<p>Year 9 computer science knowledge organiser</p> <p>Animation</p> <p><a href="https://blender.org">blender.org - Home of the Blender project - Free and Open 3D Creation Software</a></p> <p>Physical computing</p> <p><a href="https://microbit.org">Micro:bit Educational Foundation   micro:bit (microbit.org)</a></p>

### Term 3

Subject:	Curriculum Overview	<p>Programming 2 - This unit begins right where 'Programming 1' left off. Learners will build on their understanding of the control structures' sequence, selection, and iteration (the big three), and develop their problem-solving skills. Learners will</p>
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<p>Computer Science</p> <p>Year 7</p>		<p>learn how to create their own subroutines, develop their understanding of decomposition, learn how to create and use lists, and build upon their problem-solving skills by working through a larger project at the end of the unit.</p> <p>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.</p>
	<p>Support Materials / Additional suggested activities</p>	<p>Year 7 computer science knowledge organiser</p> <p>Programming 2</p> <p><a href="#">Scratch - Imagine, Program, Share (mit.edu)</a></p> <p>Gaining support for a cause</p> <p><a href="#">Bias and reliability - Bias and reliability - KS3 Computer Science Revision - BBC Bitesize</a></p>

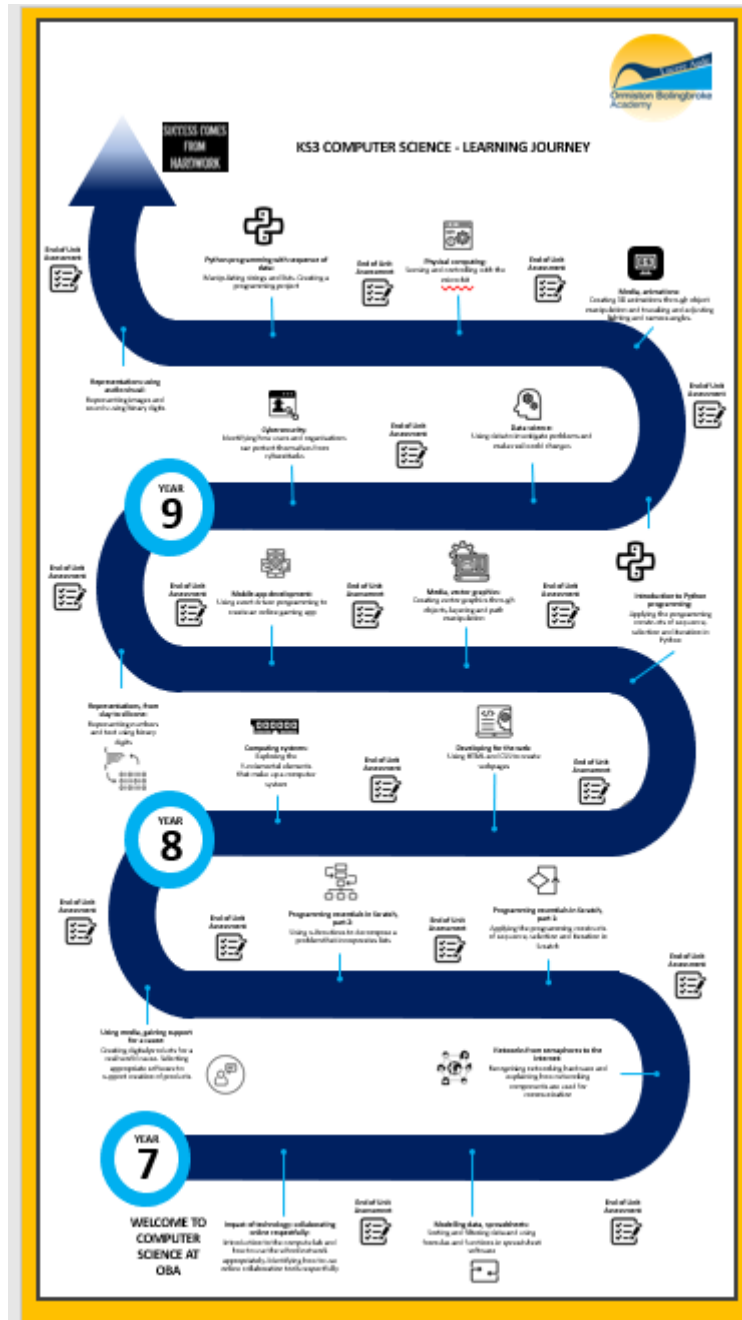
<p>Subject:</p> <p>Computer Science</p> <p>Year 8</p>	<p>Curriculum Overview</p>	<p>Mobile app development - In a world where there's an app for every possible need, this unit aims to take the learners from designer to project manager to developer in order to create their own mobile app. Using App Lab from code.org, learners will familiarise themselves with the coding environment and have an opportunity to build on the programming concepts they used in previous units before undertaking their project. Learners will work in pairs to consider the needs of the user; decompose the project into smaller, more manageable parts; use the pair programming approach to develop their app</p>
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		<p>together; and finish off by evaluating the success of the project against the needs of the user.</p> <p>Representations - 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>Support Materials / Additional suggested activities</p>	<p>Year 8 computer science knowledge organiser</p> <p>Mobile app development</p> <p><a href="#">App Lab   Code.org</a></p> <p>Representations</p> <p><a href="#">Number systems - Binary - CCEA - GCSE Maths Revision - CCEA - BBC Bitesize</a></p>

<p>Subject: Computer Science  Year 9</p>	<p>Curriculum Overview</p>	<p>Python programming with sequences of data - 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. Great care has been taken so that the selection of problems used in the programming tasks are realistic and engaging: learners will process solar system</p>
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		<p>planets, book texts, capital cities, leaked passwords, word dictionaries, ECG data, and more.</p> <p>A range of pedagogical tools are employed throughout the unit, with the most prominent being pair programming, live coding, and worked examples.</p> <p>Audio-visual - In this unit, learners will focus on digital media such as images and sounds, and discover the binary digits that lie beneath these types of media.</p> <p>Just like in the previous unit, where learners examined characters and numbers, the ideas that learners need to understand are not really new to them. You will draw on familiar examples of composing images out of individual elements, mixing elementary colours to produce new ones, and taking samples of analogue signals, to illustrate these ideas and bring them together in a coherent narrative.</p> <p>This unit also has a significant practical aspect. Learners will use relevant software (GIMP and Audacity, in this case) to manipulate images and sounds and get an idea of how the underlying principles of digital representations are applied in real settings.</p>
	<p>Support Materials / Additional suggested activities</p>	<p>Year 9 computer science knowledge organiser</p> <p>Python Programming with sequences of data</p> <p><a href="https://www.python.org/">Welcome to Python.org</a></p> <p>Audio-visual</p> <p><a href="https://www.audacityteam.org/">Audacity®   Free, open source, cross-platform audio software for multi-track recording and editing. (audacityteam.org)</a></p>



Students will undertake regular assessments to check understanding and ensure they are on track to meet their targets. To support students, we have developed knowledge organisers for each of the topics, these should be used to support development of keywords and revision

Year 7 Knowledge Organiser

Year 8 Knowledge Organiser

Year 9 Knowledge Organiser

As well as timetabled lessons we are keen for students to be involved in extra curricular activities. We currently offer drop in support and enrichment sessions (Tuesday) as well as robotics club (Wednesday). These will develop over the year but if students are interested in any other extra curricular computer science activities then let us know, we can easily accommodate other activities.