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KS4 Computer Science

Department Vision

To provide high quality education in both the theoretical and applied foundations of Computer Science and Business in order to equip and train students to effectively apply this knowledge to solve real-world problems thus increase their potential for lifelong learning and give them a competitive advantage in the ever changing and challenging global work environment of the 21st century.

Curriculum

KS4: GCSE Computer Science (OCR)

At KS4, students will have the opportunity to choose one or more of our subjects to gain a qualification in. Each of these subjects have been carefully planned to deliver units of work in line with their respective exam boards.

Key Stage 4 - GCSE Computer Science – OCR J277

Students who have chosen Computer Science as a GCSE qualification will be taking the OCR specification. The specification of the course can be found on the OCR website: https://www.ocr.org.uk/qualifications/gcse/computer-science-j277-from-2020/

The course is 100% exam based across two papers, both papers will be taken by students at the end of Year 11.

Below are the units of work that students will complete during Year 10 and Year 11 in preparation for their GCSE assessments.

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	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 10	**Unit 1 – System Architecture**	**Unit 3 – Networks, Connections & Protocols**	**Unit 4 – Network Security and System Software**	**Unit 5 – Impact of Digital Technology**	**Unit 6 – Algorithms**	**Unit 8 – Logic and Languages**
Unit Overview	Students will gain an understanding of the components in a computer system, and understand the finer details of the CPU. Students will also explore different storage mediums and will be able to compare the characteristics of these.	Students will gain an advanced understanding of computer networks, and learn about different network components, wireless connections, network protocols, addressing and network topologies.	Students will gain an advanced understanding of the different types of computer system and network threats, methods to prevent threats, utility software and their purposes, and different operating systems across various devices.	Students will gain an advanced understanding of the ethical, cultural, legal and environmental implications of digital technology. Students will explore different positive and negative impacts of technology on ECLE.	Students will gain an advanced understanding of searching and sorting algorithms whilst improving their algorithmic thinking skills. Students will be creating algorithms using Pseudocode and Flowcharts for various problems.	Students will gain further understanding of the different logic gates and their truth tables. Students will be able to create different logic circuits given an equation. Students will also gain an understanding of defensive design within programming, test designing and different forms of programming languages.
Assessment	**W/B 19/11/2020 End of unit assessment**	**W/B 14/12/2020 End of unit assessment**	**W/B 08/02/2021 End of unit assessment**	**W/B 29/03/2021 End of unit assessment**	**W/B 24/05/2021 End of unit assessment**	**W/B 05/07/2021 End of unit assessment**

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Year 11	Unit 2 – Data Representation	Unit 7 – Programming	Mock Paper Revision and Topic Re-visits	Topic Re-visits and Exam Practice	GCSE Exam Preparation	Post-Exam
Unit Overview	During this unit of work, students will re-visit number systems and understand how binary is used to represent different types of data on a computer system such as images, sound and characters. Students will have the opportunity to decipher binary into these different forms of data.	During this unit of work, students will further their programming skills continuing to use Python to further enhance their algorithmic thinking and programming skills. Students will gain a further understanding of different data types used, creating and using functions. Students by the end of the topic should be able to create various programs for given problems.	During this term, students will have the opportunity to revisit units of work, practice exam-style questions and have access to a range of different revision materials.	During this term, students will have the opportunity to revisit units of work and practice exam-style questions.	During this term, students will have the opportunity to revisit units of work, practice exam-style questions and have access to a range of different revision materials.	During this term, students will have completed their Computer Science examinations and will be using class time to revise for other upcoming subjects.
Assessment	**W/B 19/11/2020 End of unit assessment**	**W/B 14/12/2020 End of unit assessment**	**Mock 1**	**Mock 2**	**Knowledge Organisers Final Exams**	

What Eastlea has been involved in:

In December 2015, Eastlea pupils attended an “hour of code” at 10 Downing Street to teach Nicky Morgan (former education secretary) and David Cameron (former Prime Minister) some basic computer programming. Students had the privilege to accompany the teachers to visit the Prime Minister and the Education Secretary, this has no doubt helped the students to:

- Meet MPs to teach them about computer programming
- Demonstrate the impact of STEM on education
- Development of confidence.
- Develop aspirations for leadership, reaching as far as senior politician.

Eastlea students have been involved in Microsoft BETT conference

Students took part in an event, representing the school presenting and teaching use of technology to teachers and business at BETT. They manned a stand (table) showcasing what they’ve learnt using the Micro:bit and also demonstrating some of the things that they’ve built, such as robotic cars, hover crafts, fans, electronic arm, all controlled by the Micro bit.

In January 2017 Eastlea students took part in the Mosaic Enterprise Challenge. Founded by HRH The Prince of Wales, Mosaic inspires young people to realise their talents and potential. The Enterprise Challenge is designed to bring together business mentors and students to champion the talent, skills and energy found in our local community.

Volunteers from Barclays teamed up with Mosaic to mentor our Year 9’s as part of the flagship Mosaic programme to demonstrate the many benefits of business competition. During the Challenge, 57 students competed in an online business simulation game, and completed a module about ethical business and sustainability. The winning team virtually raised over £2.7 million during the day.

This has helped students to Network with and learn from professionals from the finance field and academic high achievers.
Students put in practice their knowledge in the simulation game and saw the type of funds that can be garnered from various types of investments.

CEO of Microsoft visits Eastlea

In November 2015 Microsoft CEO Satya Nadella visited Eastlea Community School for the launch of the BBC Micro:bit, as Eastlea was one of the first schools in the entire country to get their hands on this new device. He met with staff and students to see how they have been inspired into coding and creativity by the BBC

Micro:bit. He was joined by the BBC's Director General, Lord Tony Hall. They were both equally impressed with the computational thinking and programming skills of Eastlea year 7's. The students at Eastlea then turned their hand to broadcast journalism by creating a video as part of the BBC News School

Report:
Students then travelled to Future Decoded where they took up residence of the Microsoft in Education stand to show to the other attendees how they had used TouchDevelop to program their BBC Micro:bit's to be able to do all sorts of innovative and wonderful ideas. A lot of the creations involved integrating the BBC Micro:bit with other objects and devices, giving the students first-hand experience of how they themselves can help to shape the emerging revolution of computers.

Eastlea Computing teachers have helped the BBC to plan a series of lessons about Computer Science and students from Eastlea have taken part and were filmed. You can see our students taking part in the lessons we planned here
http://www.bbc.co.uk/programmes/articles/3ydvd6mvhl89cHVJ7F2nmzf/doctor-who-and-the-micro-bit-live-lesson

Useful links for Independent Learning and revision:

Course specification

https://www.ocr.org.uk/qualifications/gcse/computer-science-j276-from-2016/

Craig and Dave

https://www.youtube.com/channel/UC0HzEBLlJxlrwBAHJ5S9JQg

Learn Python

http://www.pythonschool.net/

Resources

http://mrfraser.org/

To practice Python programming

https://snakify.org/en/

Online Revision Notes and Practice Questions

https://www.senecalearning.com/

Computer Science Resources

http://teach-ict.com/

BBC Bitesize

http://www.bbc.co.uk/schools/gcsebitesize/

Cambridge Elevate

https://elevate.cambridge.org/elevate/

Online Python

https://repl.it/languages/python3

Coding on different platform

https://trinket.io/

Books for OCR Specification

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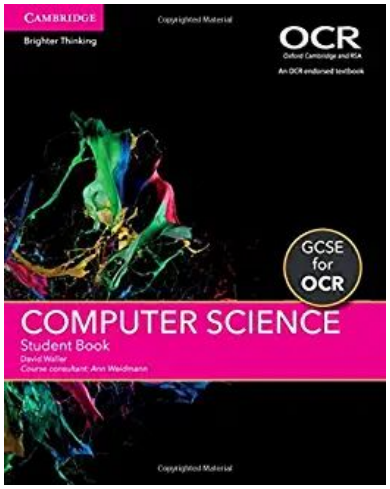
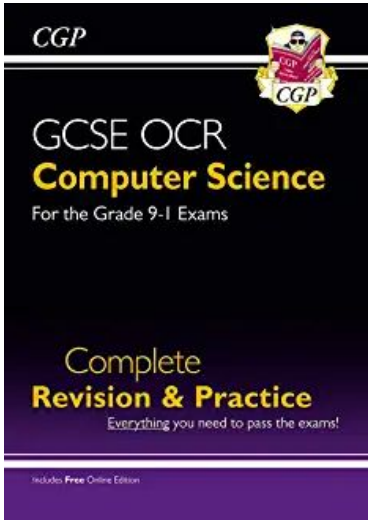
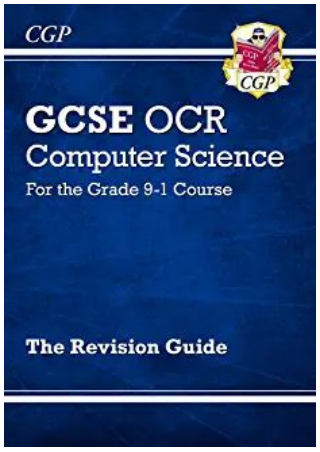


GCSE Computer Science for OCR Student Book

by Course consultant Ann Weidmann David Waller | 30 Apr 2016



GCSE Computer Science OCR Complete Revision & Practice - for exams in 2020 and 2021 (CGP GCSE Computer Science 9-1 Revision)



GCSE Computer Science OCR Revision Guide - for exams in 2020 and 2021 (CGP GCSE Computer Science 9-1 Revision)

Academic Intervention

- **1:1 Support**
  Support is given to students who are either struggling or cause for concern.
- **Revision Packs**
  These are provided to all the students which contains all topics covered with questions that they can work through in order to help them better prepare for the exams. Revision packs consist of:
    - **Revision Guides** (at cheaper than RRP or free to Pupil Premium students)
    - **Knowledge Organisers** for every unit of work at KS4
    - **Exam Style Questions** from all past papers
    - **Flash Cards** for students to make individual notes
- **Google Classroom Support**
  All lessons and worksheets in lessons are uploaded to Google Classroom where students can access all of the content including the majority of the resources from the Revision Packs above and additional resources. Students can also communicate with teachers outside of the classroom using Google Classroom for extra support.
- **Monitoring**
  Regular monitoring of students carried out through termly cycles, Narrowing the Gap and Curriculum Meetings to identify underperforming students so that relevant interventions can be put in place.
- **Personal Enrichment / Extra-curricular**
    - Enrichment clubs for all years once a week.
    - Study Clubs for Year 11 once a week.

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