Subject:	Computing
Specification:	
Exam Board	AQA

At the Open Academy we strive to ensure all students have the ability to use computational thinking, technology and creativity to enhance their learning and future life.

Students have access to a wide range of specialist IT equipment and software applications which support learning across all aspects of the curriculum. The department offers pupils the opportunity to develop their computing, creative and IT skills as well a range of transferable skills such as effective commination and logical thinking which are vital abilities in society today.

We pride ourselves in providing students with a wide range of engaging tasks in a positive and safe learning environment in order that students learn to be responsible and effective users of technology.

Key Stage 3 Computing

We have developed a curriculum across Key Stage 3 that follows the National Computing curriculum. It develops and challenges our students and includes but is not limited to: E-safety, sound editing, digital imaging using Adobe software. Desktop publishing, word processing, spreadsheet modelling and formal electronic communication using Microsoft Office. 2D/3D Animation using Alice/ Sketchup /Blender and both visual and text based programming in Scratch/Alice, MIT App Inventor and Small Basic/C# respectively.

Key Stage 4 Computer Science and IT

Within Key Stage 4, there are two courses available to all students to opt for. These qualifications are the BTEC Digital Information Technology and the AQA GCSE Computer Science and the BTEC Digital Information Technology. The former is a creative course exploring user interface (UI) with modern digital content, such as cloud computing and cyber security. We aim to draw upon the students' imagination and creativity in the design, production and refinement of a UI. By contrast the AQA GCSE Computer Science is a more mathematically grounded subject where students embark upon an exciting journey through programming and computer systems with an assignment in Year 11 involving students creating their own programs. Students learn the importance of computational thinking which underpins all computer systems as well as getting an appreciation for computer hardware.

Key Stage 5 Computer Science and IT

At Key Stage 5 there is again a split between Computing and ICT. In AQA GCE Computer Science the students push their understanding of computational thinking, programming and computer hardware further and will produce a substantial application in response to a client brief by using their programming skills over the two-year course. In the first and second year students will also take on on-screen exams based on programming skills and written exams. In OCR Technicals Level 3 IT on the other hand, our students progress through one examined unit which develop the students' understanding of the use of ICT in the world of business and work, followed by coursework units whereby students will be able to express their creativity working toward developing digital solutions based on client briefs.

With the mix of computing and ICT options available within the Department, we believe that we offer every young person valuable skills which will equip them for a world where technological skills are paramount.

After school clubs on offer

Codeclub – Learn to code, open to all.

Project Refurb – Hardware meets software. What can you invent?

BAFTA Young Game Designer- Are you going to design and create the next big game? Find out.

All clubs run on a Wednesday from 3:15 to 4:45

Resources:	
Useful websites:	Scratch - https://scratch.mit.edu/ ALICE 3 - http://www.alice.org/ SmallBasic - http://smallbasic.com/ Sketchup - https://www.sketchup.com/ MIT App Inventor - http://appinventor.mit.edu/ Visual Studio Community Edition - https://imagine.microsoft.com/enus/Catalog/Product/530 **Year 7-11** www.yacapaca.com www.samlearning.com www.cram.com www.bbc.co.uk/education **Year 10-11** YouTube Playlist CS Tutor – AQA – Paper 1 Theory YouTube Playlist CS Tutor – AQA – Paper 2 Theory

Curriculum Sequencing Rationale

1a.	**What are the key topics taught in Year 7?** Using Cloud Computing Safely, Effectively and Responsibly Understanding computer hardware and data representation Computational Thinking and Algorithms Graphical/Textual Programming The internet STEM Project – Synergy of Hardware and Software
1b.	**Why is this?** We follow the national curriculum for Computing and are passionate about its aims for our learners. Year 7 starts with a unit to ensure learners are **responsible**, competent, confident, and creative users of information and communication technology. The following unit, computer hardware and data representation help learners understand and apply the fundamental principles and concepts of computer science. The Computational Thinking and Algorithms unit introduces abstraction, logic, and algorithms so that learners can analyse problems in computational terms. All units offer repeated practical experience of writing computer programs to solve problems and the Graphical/Textual Programming unit focuses solely on this curriculum aim. The Internet unit has how focuses on how learners and digital devices communicate with one another and with other systems. The year ends with applying the knowledge in a STEM project in the final summer half term so that learners can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems.
2a.	**What order is this taught in and why?** In the order stated above. We believe that learners must first understand the importance of being **responsible** users of technology and be taught the core software knowledge/skills required as many will have varied experiences based upon a varied key stage two curriculum delivered. The knowledge and skills introduced in this first unit are built upon in the second unit as we learn how hardware interprets the software that our learners have been introduced to previously, hence data representation and the humble switch. Moving onto the next unit, our learners, equipped with software/hardware knowledge and skills, we ask ourselves why do they need these? The answer is simple, to solve problems and make life better for humans. Ironically the coined term 'Computational Thinking' is all about

	thinking about how we can help humans solve problems. Moving onto unit four our learners look out how to build upon the design and problem-solving skills and start to 'cut some code'. All units offer repeated practical experience of writing computer applications (apps) however this unit is solely about coding apps. Unit five builds upon how apps, hardware and humans interact, always together/collaborative, with a focus on how the internet has changed society. The final unit is about collaboration and is a celebration of knowledge, and skills with learners tackling a STEM-based project.
3a.	**How do we build on these topics and rationale in Year 8** Using Cloud Computing Safely, Effectively, Responsibly and **Collaboratively** building upon protecting their online identity and privacy Understanding computers and data representation binary and hex, and simple Boolean logic [for example, AND, OR and NOT] Computational Thinking / Algorithms building upon flowcharts introducing pseudocode Graphical/Textual Programming - building upon operators (mathematical/comparison/logical) The internet introducing IOT – Internet of things STEM Project – Synergy of Hardware and Software building upon collaboration techniques – team games
3b.	**What order is this taught in and why?** In the order stated above with the same rationale as in section 2a. In year 8 we use a spiral Curriculum model as learners return to the same topic many times through Key stage 3 sometimes drawing up resources from year 7 and sometimes drawing down content from Year 8. Increasing Depth: Every time a learner returns to the concept it must explore more complexity and be learned at a deeper level Prior Knowledge: A student's previous knowledge must be used when the learner comes back to the same concept so that he builds from the foundation instead of starting from the beginning.
4a.	**How do we build on these topics and rationale in Year 9?** Using Cloud Computing Safely, Effectively and Responsibly introducing Cybersecurity Understanding computers and data representation – introducing images and sound Computational Thinking and Algorithms Textual Programming introduces subroutines Internet introducing 'Big Data' STEM Project – Synergy of Hardware and Software
4b.	**What order is this taught in and why?** In the order stated above with the same rationale as in section 2a. In year 9 we continue to use a spiral Curriculum model as learners return to the same topic many times through Key stage 3 sometimes drawing up resources from year 8 and sometimes drawing down content from Year 10 GCSE Computer Science. Increasing Depth: Every time a learner returns to the concept it must explore more knowledge/skills and be learned/practised at a deeper level/more frequent Prior Knowledge: A student's previous knowledge must be used when the learner comes back to the same concept so that he builds from the foundation instead of starting from the beginning.
5a.	**Select one concept/theme you teach in your subject across more than one key stage** **How is this taught each year?** **The theme - Data representation across KS3** Year 7 – understand how numbers can be represented in binary. Year 8 - understand how text can be represented in binary. Explore 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 hexadecimal, and be able to carry out simple operations on Year 9 - binary and hexadecimal numbers [for example, binary addition, and conversion between binary and decimal] 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 **The how** All of this is taught using principles of gamification and utilising collaboration tools. We also use an engaging interactive learning platform that employs summaries, notes, videos, and lots of different types of practice questions and other low stake assessments to guide teaching based upon the principles of Assessment for Learning (AfL). This is all underpinned by the use of knowledge organisers in class to help guide learners to key knowledge and skills required.

5b.	**How does this become progressively more challenging?** In designing a curriculum in a spiral approach, we have crafted units of work with increasing complexity; by building links across prior knowledge across the units of study and always starting where the last unit ended. Our spiral curriculum model ensures that courses do not include just a single lesson. Each unit of work or course that is taught to the students builds upon previously taught concepts with a focus on building links across prior units of study.
6.	**What exam boards do you use in KS4 and KS5 and why?** AQA is used in both KS4 and KS5 Computer Science as it offers our learners a consistent approach to the vocabulary used both in Science and Mathematics. This allows the learner to access resources on a familiar platform, resources including course specifications, past papers, mark schemes, exam commentaries and others. At KS5 in Information Technology, the OCR exam board is used as it offers our learners a consistent approach to the vocabulary used in Business, a similar vocational option at KS4/KS5 for our learners. This allows the learner to access resources on a familiar platform, resources including course specifications, past papers, mark schemes, exam commentaries and others. At KS4 in Information Technology, we have used Pearson BTEC and OCR exam boards. This vocational pathway is based upon the needs of the cohort and our recent hybrid approach to delivering based on our learners needs has been successful. **How does this link to your KS3 curriculum?** In KS3 Computing students many concepts are modelled from AQA to ease the transition to KS4 study, with a focus on how to answer questions adapted from AQA past papers. The vocational pathway of IT at KS4 remains true to the aim of the national curriculum for Computing at KS3 with learners able to evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems that are responsible, competent, confident, and creative users of information and communication technology
7.	**What career opportunities does the study of your subject bring?** Many career opportunities, past, current and future. To reiterate, we follow the national curriculum for Computing and are passionate about its aims for our learners A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.