Acle Academy

Year 10 – Components of a Computer System
Computer Science

Rationale and Context of Unit:	Core curriculum content:	Tier 2 & Tier 3 vocabulary explicitly taught:		
The use and application of computing devices is present in many areas of our world, from the personal devices we use on a daily basis, to the systems that control and automate industrial processes. Through these devices we are almost always connected to a wider network in some form or another. It is important that educators equip learners with the knowledge and skills to thrive in a world where they are surrounded by computer systems and networks. An understanding of how our networks, systems, and devices work is foundational knowledge for all students of computing. Empowered with this knowledge, learners can understand the advantages and limitations of computer systems, and discover how data is transmitted and the associated risks. The same understanding helps learners develop mental models of how computers operate, interpret, and execute instructions. An understanding of how systems and networks work, and the factors that affect their performance, enables learners to design and evaluate solutions to real world scenarios, as well as understand the impact of those solutions on our lives. Once learners identify the systems and networks around them, they can begin to look inside and discover the devices and components that work together to perform a task. Learners begin to think about the inputs to a system, the processes it carries out, as well as the outputs it produces. This input, process, output (IPO) model is then evident throughout the study of computer systems and networks.	**Year 10: Components of a Computer System** **Computer Systems:** Hardware is a physical component. Software is a program that runs on the computer. **Boolean:** Computers are made of logic gates. **Software Classification:** Utility programs are small programs that are used in the Operating System. Application Software is for users to perform tasks. **Programming:** Python **Architecture:** CPU RAM ROM Cache Register	**Computer Systems** Hardware Software	**Boolean** NOT AND OR XOR	**Software Classification** System Application Processor Memory Input / Output Applications Security
		Programming Low-level language High-level language Interpreter Compiler Assembler	**Architecture** CPU RAM ROM Cache Register	
Challenge and Support:	**Worldwide learning / links to 21st century:**	**Cultural capital/ Industry/ Enrichment:**		

Python is a general coding language that enable students to transfer their knowledge onto Post-16 courses with ease.

Coding is a complex element of the course with students demonstrating a varying ability. To ensure that students can see the purpose of machine code real life contexts need to be applied so that students can understand the purpose and use of coding within the jobs market.

All students read sections from the book Clear Revise AQA Computer Science 8525 to reinforce more complex elements of the course. This is a bookable resource from the school library.

Electronic student workbooks have been create for students to independently research and evidence their understanding. Exemplar work is then displayed to the class to ensure a good standard of work is created.

We know digital skills are becoming ever more important in today's economy, and employers indicate that about one-third of vacancies they find difficult to fill are, to some degree, attributable to a lack of appropriate digital skills amongst applicants. The term "digital skills" covers a wide array of competencies, knowledge, and skills, making it difficult to design interventions to address digital skills needs.

Specific digital skills are key to unlocking opportunities for students and addressing the shortage of digitally skilled workers in the UK. Digital skills are an essential entry requirement for two-thirds of UK occupations and carry with them a wage differential over non-digital roles.

https://www.futurelearn.com/info/courses/programming-101/0/steps/43783

The course has been designed to enable students a sustained period of time to work with the programming language Python. Python is the most universal language within the Computer Science industry. Should students develop their programming skills to a reasonable standard transferring onto other programmable platforms such a Java or BASIC will be easier.

To further enrich our student's links have been made with the following to further develop the learning experience of our students.

Worldwide:
MSI Defence Systems Ltd: Norwich
Local:
East Norfolk Sixth Form College

Historical, Social, Moral, Spiritual, Cultural context:	Cross curricular links/ literacy/numeracy:	Common misconceptions:
At its core, teaching computer science is often about teaching students how to think in a different way than they are used to. This can be done through low-tech options such as giving someone directions or block-based coding, or it can be done through high-tech electronics projects such as building a robot. The earlier students are exposed to computer science concepts, the higher their chances of developing an interest in computer science and pursuing it further. By waiting until high school to introduce computer science to students, you run the risk of them already having preconceived notions about what they are and are not good at. Additionally, many schools currently rely on elective courses to teach computer science, further narrowing the pool to those students who already know they are interested in learning more.	**Gatsby Benchmark:** https://www.bbc.co.uk/bitesize/articles/zjvf2sg https://www.bbc.co.uk/bitesize/articles/zmq3jhv https://www.bbc.co.uk/bitesize/articles/z4jn2sg **STEAM Ambassadors:** Students will be awarded a STEAM ambassador badges if they have been identified for doing exceptional work either academically or practically within this Design Technology curriculum. **Cross Curricular links:** The department has linked all KS3 schemes of learning with ICT: Further Coding **(YEAR 7)** ICT: What is a Computer **(Year 9)**	While it is true that men currently outnumber women in computer science fields, this has not always been the case. Up until the mid-1980s, the number of women receiving degrees in computer science actually outpaced the number of men receiving the same degree. Before then, women were power houses in computer science and have been credited with everything from being the first computer programmer to programming the first computer to helping create the internet itself.

Assessment timeline:

GCSE computer Science covers a large array of different concepts. Through the AQA Specification these have been broken into 9 different units. Due to natural cross overs in content units have been simplified into 7 Units of work;

Unit 1: Computer Systems
Unit 2: Networks
Unit 3: Ethical, legal and environmental impacts
Unit 4: Fundamentals of data representation
Unit 5: Programming
Unit 6: Programming Project
Unit 7: Fundamentals of algorithms

Throughout subject knowledge delivery formative assessments take place throughout. These formative tests are in the form of class quizzes and are tracked throughout on the student assessment sheet within class folders. At the end of the unit delivery scheme of learning students take a test that amalgamates these tests into one large test. This data is recorded onto the front of student folders and informs teachers and students of subject knowledge retained. Students will be questioned during plenaries of lessons and will be asked to explain the previous lessons content at the start of the following lesson.

Through the use of Google Forms statistics are provided for teachers to identify specific areas of poor student knowledge retention. This information enables teachers amend teaching practice if required or enable more time to be given in its delivery.

Unit 1: Components of a Computer System	
Computer Systems	**10 marks**
The CPU	**12 marks**
Memory	
CPU & Systems Performance	**11 marks**
Secondary Storage	**20 marks**
Systems Software	**18 marks**
Open Source & Proprietary Software	**16 marks**
End of Unit Assessment	**87 marks**

Home learning

Seneca is implemented as the home learning platform for AQA Computer Science. Retrieval practice means the repetition of subject content further supports classroom delivery if it happens at calculated intervals. Seneca learning platform does not only increase the students' engagement but has also scientifically proven to let students learn two times faster. Seneca covers AQA Computer Science with exam board specific questions and is written by senior examiners & industry experts. This coupled to student Google Classrooms enables assignments that show you the student's grade, study time and number of attempts.

Feedback

Computer Science uses subject specific front sheets to inform students of their academic achievements. These percentage scores demonstrate student attainment across specification units and enables students to focus on areas of weakness prior to Summative Assessment or MOCK exams.

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Unit 1: Computer Systems

Secondary Storage | Logic Gates | RAM & ROM | Embedded Systems

Software Types

Embedded Systems

Secondary Storage

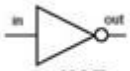
Secondary Storage

Optical Storage

Universal Serial Bus

Solid-state storage

Logic Gates

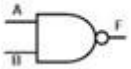


NOT

Input	Output
1	F
0	1
1	0

AND

Inputs		Output
A	B	F
0	0	0
1	0	0
0	1	0
1	1	1

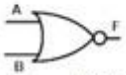


NAND

Inputs		Output
A	B	F
0	0	1
1	0	1
0	1	1
1	1	0

OR

Inputs		Output
A	B	F
0	0	0
1	0	1
0	1	1
1	1	1



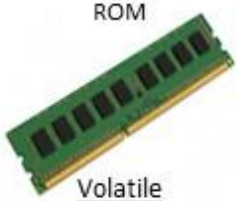
NOR

Inputs		Output
A	B	F
0	0	1
1	0	0
0	1	0
1	1	0

Main Memory

CPU

Non-Volatile ROM



Volatile RAM

Input / Output devices

Input
Mouse

Output
Speaker

Input / Output
Headset

python™

```
1  print('Hello, Welcome to Unit 1: Computer Systems !')
```

```
Hello, Welcome to Unit 1: Computer Systems !
>
```