



Computer Science


Key Stage 4 Framework for Learning

Year 11 2017-2018: I am Creative, Successful and Happy

Syllabus:

GCSE (9-1) Computer Science OCR


Autumn 1

<p>Knowledge</p>	<p>Unit 3 aims to give students the programming skills needed to solve a task.</p> <p>The learner will: Practice the programming skills needed for the Non-Examined Assessment.</p> <p>The learner can:</p> <ul style="list-style-type: none"> • Understand and use sequence, selection and iteration. • Understand and use suitable loops (count and condition controlled loops). • Understand and use basic string manipulation. • Understand and use basic file handling operations. • Define and use arrays as appropriate. • Understand and use functions. • Work with characters and Boolean operators. • Casting data types
<p>Skills</p>	<ul style="list-style-type: none"> • Thinking abstractly • Thinking ahead • Thinking procedurally • Thinking logically • Thinking concurrently • Python Programming skills
<p>Assessment</p>	<p><i>Assessment 1 in books:</i></p> <p>Program Flow - exam style question (OCR 9-1 Exam practice workbook)</p> <p><i>Assessment 2 in books:</i></p> <p>File Handling - exam style question (OCR 9-1 Exam practice workbook)</p> <p><i>Doddle x 2:</i></p> <ul style="list-style-type: none"> • Handling Data in Algorithms OCR - Mini Quiz • Understanding Algorithms OCR - Mini Quiz
<p>Cultural enrichment</p>	<ul style="list-style-type: none"> • Planning effective programs • Problem solving • Computational thinking
<p>Character</p>	 <p>QofS – Optimism</p>



Autumn 2

<p>Knowledge</p>	<p>Non-Examined Assessment</p> <p>The learner will: Complete the Non-Examined Assessment (20 hours)</p>
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	<p>The assessment is externally set. It is administered under timed external assessment conditions. Students have a maximum of 20 hours to complete the programming task and written report.</p> <p>Students will have no access to the internet, they will only have access to a generic resource bank which cannot be added to after the release of the tasks on September 1st.</p> <p>Secure accounts (separate to their usual accounts) will be created to ensure students do not have access to the internet or shared drives.</p>
Skills	<ul style="list-style-type: none"> • Thinking abstractly • Thinking ahead • Thinking procedurally • Thinking logically • Thinking concurrently • Report writing • Python Programming skills
Assessment	<p>Non-Examined Assessment:</p> <p>Non-Examined Assessment (20 hours)</p> <p><i>C/E Exam:</i></p> <p>Students will complete a College Entry exam which will be a mock of both papers on the upcoming exam.</p> <p><i>Assessment 1 in books:</i></p> <p>Testing - exam style question (OCR 9-1 Exam practice workbook)</p> <p><i>Assessment 2 in books:</i></p> <p>IDE - exam style question (OCR 9-1 Exam practice workbook)</p> <p><i>Doddle x 3:</i></p> <ul style="list-style-type: none"> • Error Handling OCR - Mini Quiz • Python V3 - Mini Quiz 1 • Python V3 - Mini Quiz 2
Cultural enrichment	<ul style="list-style-type: none"> • Planning effective programs • Problem solving • Computational thinking
Character	 <p>QoFS – Empathy</p>
Spring 1	
Knowledge	<p>Unit 1 aims to give students an introduction to computer systems, how they work and the ethical, legal, cultural and environmental concerns associated with Computer Science.</p> <p>1.1 Systems architecture Students will build their knowledge on the following areas:</p> <ul style="list-style-type: none"> • The purpose of the CPU • Von Neumann • CPU components • Function of the CPU • Embedded systems <p>1.2 Memory Students will build their knowledge on the following areas:</p>





	<ul style="list-style-type: none"> • Ram V Rom • Purpose of Ram • Purpose of Rom • Virtual memory • Flash memory <p>1.3 Storage Students will build their knowledge on the following areas:</p> <ul style="list-style-type: none"> • Secondary Storage • Data Capacity • Common types of storage • Characteristics of storage <p>1.4 System Software Students will build their knowledge on the following areas:</p> <ul style="list-style-type: none"> • Purpose and functions of system software • Utility system software <p>2.3 Producing robust programs Students will build their knowledge on the following areas:</p> <ul style="list-style-type: none"> • Defensive design considerations • Maintainability • Purpose of training • Types of testing • Syntax and logic errors • Selecting suitable test data
	<ul style="list-style-type: none"> • Discuss the elements of a computer system • Describe the purpose of RAM/ROM • Explain the Von Neumann theory • Recognize the advantages and disadvantages of different storage devices. • Distinguish between different types of software.
Assessment	<p><i>Assessment 1 in books:</i></p> <p>CPU and System Performance - exam style question (OCR 9-1 Exam practice workbook)</p> <p><i>Assessment 2 in books:</i></p> <p>Systems Software - exam style question (OCR 9-1 Exam practice workbook)</p> <p><i>Doddle x 2:</i></p> <ul style="list-style-type: none"> • The CPU and Memory OCR - Mini Quiz • Software OCR - Mini Quiz
Cultural enrichment	<ul style="list-style-type: none"> • Understand the impacts of digital technology to the individual and to wider society • Appreciate issues of cost and suitability of different types of storage
Character	<div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p>QoS – Creativity & Curiosity</p>
<h2>Spring 2</h2>	
Knowledge	<p>Unit 2 aims to give students an introduction to algorithms, robust programming, computational logic and data representation.</p> <p>2.1 Algorithms Students will build their knowledge on the following areas:</p> <ul style="list-style-type: none"> • Computational thinking • Standard searching algorithms • Standard sorting algorithms • How to produce algorithms • Interpret, correct or complete algorithms



	<p>2.4 Computational Logic Students will build their knowledge on the following areas:</p> <ul style="list-style-type: none"> • Binary representation • Logic diagrams • AND/OR/NOT • Truth tables • Mathematical operators <p>2.5 Translators and facilities of languages Students will build their knowledge on the following areas:</p> <ul style="list-style-type: none"> • Low and High level languages • Purpose of translators • Assembler, compiler and interpreter • IDE features and tools <p>2.6 Data Representation Students will build their knowledge on the following areas:</p> <ul style="list-style-type: none"> • Units • Numbers • Characters • Images • Sound • Compression
Skills	<ul style="list-style-type: none"> • Converting denary to binary and vice versa, denary to hex and vice versa, binary to hex and vice versa. • Calculating binary (additions) • Binary shifts • Recognizing the difference between High and Low level languages and how they run. • Interpreting logic diagrams and truth tables. • Performing searching and sorting algorithms on sets of data.
Assessment	<p><i>Progress test:</i></p> <p>Students will complete a progress test (mock) which will reflect both papers on the upcoming exam.</p> <p><i>Assessment 1 in books:</i></p> <p>Units (check digits and parity) - exam style question (OCR 9-1 Exam practice workbook)</p> <p><i>Assessment 2 in books:</i></p> <p>Translators - exam style question (OCR 9-1 Exam practice workbook)</p> <p><i>Doddle x 3:</i></p> <ul style="list-style-type: none"> • Binary Logic OCR - Mini Quiz • Representation of Data 1 OCR - Mini Quiz • Representation of Data 2 OCR - Mini Quiz
Cultural enrichment	<ul style="list-style-type: none"> • The effect of Computational Thinking • Planning effective programs • Problem solving
Character	<div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p>QofS – Responsibility & Reflection</p>
Summer 1	
Knowledge	<p>Unit 1 aims to give students an introduction to computer systems, how they work and the ethical, legal, cultural and environmental concerns associated with Computer Science.</p> <p>1.5 Wired and Wireless Networks</p>



	<p>Students will build their knowledge on the following areas:</p> <ul style="list-style-type: none"> • Types of networks • WAN/LAN • Performance factors • Client V peer-to-peer • Network hardware • WWW, DNS, hosting and the cloud • Virtual networks <p>1.6 Network Topologies, protocols and layers Students will build their knowledge on the following areas:</p> <ul style="list-style-type: none"> • Star and mesh • Wifi • Ethernet • IP, MAC and protocols • Layers • Packets <p>1.7 System Security Students will build their knowledge on the following areas:</p> <ul style="list-style-type: none"> • Forms of attack • Threats posed to networks • Identifying and preventing vulnerabilities <p>1.8 Ethical, Legal, Cultural and Environmental concerns Students will build their knowledge on the following areas:</p> <ul style="list-style-type: none"> • Ethical, legal, cultural, environmental and privacy issues • Stakeholders affected by tech • Environmental impact of Comp Sci • Open source V Propriety • Relevant Legislation
Skills	<ul style="list-style-type: none"> • Draw networks • Annotate diagrams • Recall rules of protocols • Be aware of the threats to system security • Discuss the ethical, legal, cultural, environmental and privacy issues surrounding computer science.
Assessment	<p><i>Assessment 1 in books:</i></p> <p>Security - exam style question (OCR 9-1 Exam practice workbook)</p> <p><i>Assessment 2 in books:</i></p> <p>Legislation - exam style question (OCR 9-1 Exam practice workbook)</p> <p><i>Doddle x 2:</i></p> <ul style="list-style-type: none"> • Networks OCR - Mini Quiz • The Internet OCR - Mini Quiz
Cultural enrichment	<ul style="list-style-type: none"> • Security and risks of malicious attacks on networks • Network structures for homes and business • Impact of legislation surrounding the use of ICT
Character	<div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p>QoS – Practice & Resiliency</p>