





Computer Science

Key Stage 4 Framework for Learning

Year 9 2017-2018: Happy Foundations

Syllabus:
GCSE (9-1) Computer Science
OCR J276/01


Autumn 1

<p>Knowledge</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>Skills</p>	<ul style="list-style-type: none"> • Extended writing • Discuss the elements of a computer system • Describe the purpose of Ram/Rom • Explain the Von Neumann theory
<p>Assessment</p>	<p>Marking Point 1: 3 x exam questions on the topic memory.</p> <p>Marking Point 2: 2 x exam questions on the topic storage tables.</p>
<p>Cultural enrichment</p>	<ul style="list-style-type: none"> • Understand the impacts of digital technology to the individual and to wider society • Valuable thinking skills that are extremely attractive in the modern workplace
<p>Character</p>	<div style="display: flex; align-items: center;">   <div style="margin-left: 10px;"> <p>Happy Habits: New Beginnings & Organisation QoFS - Curiosity & Responsibility</p> <p>Students are starting the course and will be focusing on the brain of the computer (the CPU). They will be asked to research the first ever CPU and why it came about. They can be shown the inside of a computer to develop their curiosity of how they work, with particular focus on the CPU.</p> <p>Responsibility, students will also be asked to develop a learning contract to explain how they will be successful in this challenging course.</p> </div> </div>


Autumn 2

<p>Knowledge</p>	<p>2.1 Wired and Wireless Networks Students will build their knowledge on the following areas:</p>
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	<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>2.2 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>2.3 System Security/Robust Progs 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
Skills	<ul style="list-style-type: none"> Draw networks Annotate diagrams Recall rules of protocols Be aware of the threats to system security Extended writing
Assessment	<p>Marking Point 1: 2 x extended exam questions on the the topic Networks (LAN & WAN)</p> <p>Marking Point 2: 3 x exam questions on network topologies</p> <p>Marking Point 3: Progress Test will be conducted during lesson and will cover the content from Autumn 1. This will be 1.5 hours long and will be based on the paper which students will sit in Year 11.</p>
Cultural enrichment	<ul style="list-style-type: none"> Security and risks of malicious attacks on networks Network structure for homes and business
Character	 <p>Happy Communities: Conduct Students will start to devvelop a learning trust circle, where they will be able to ask designated partners/buddies for help in improving on areas they found challenging in the progress test.</p>
<h2>Spring 1</h2>	
Knowledge	<p>2.4 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>2.5 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"> Be socially and culturally aware of the impact of society on computer science Extended writing Describe and discuss the features of system software




Assessment	<p>Marking Point 1: 3 x exam questions on the topic Systems Software</p> <p>Marking Point 2: 3 x exam questions on Ethical and cultural issues</p>
Cultural enrichment	<ul style="list-style-type: none"> • How key stakeholders are affected by technologies • Impact of the Data Protection Act • Importance of the Computer Misuse Act • Copyright Designs and Patents Act • Creative Commons Licensing • Freedom of Information Act
Character	<div style="display: flex; align-items: center;">  <div> <p>Happy Resolutions: New Year, New You! QoS – Resiliency</p> <p>Students will be asked to retake their progress test and try and improve their scores by 15.</p> </div> </div>

Spring 2

Knowledge	<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>2.2 Programming Techniques Students will build their knowledge on the following areas:</p> <ul style="list-style-type: none"> • Use of variables, constants, operators, inputs, outputs and assignments • Sequence, selection and iteration • Basic string manipulation • File handling operations • Storing data • SQL • One and two dimensional arrays • Functions and procedures • Data types • Arithmetic and Boolean operators <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
Skills	<ul style="list-style-type: none"> • Plan algorithms • Design and draw algorithms • Practice their programming skills by using 'Python' and online hosts such as 'Khan Academy' and 'Code Academy'
Assessment	<p>Marking Point 1: 3 x exam questions on the topics computational thinking and algorithms</p> <p>Marking Point 2: 4 x exam questions on search and sort algorithms</p> <p>Marking Point 3: Progress Test will be conducted during lesson and will cover the content from Spring 1. This will be 1.5 hours long and will be based on the paper which students will sit in Year 11.</p>
Cultural enrichment	<ul style="list-style-type: none"> • The effect of Computational Thinking • Planning effective programs



Character	 <p>Happy Hearts & Minds: Cultural Capital</p> <p>Students will be asked to create elaborate/challenging algorithm puzzles for fellow classmates to solve.</p>
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Summer 1

Knowledge	<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
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Skills	<ul style="list-style-type: none"> • Converting denary to binary • Calculating binary (additions) • Recognizing the difference between High and Low level languages • Confidentially using the tools in the Python IDE
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Assessment	<p>Marking Point 1: 3 x exam questions on the topic logic gates</p> <p>Marking Point 2: 2 x exam question on Units</p>
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Cultural enrichment	<ul style="list-style-type: none"> • Changes to available software • Effective tools and features of available programming software
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Character	  <p>Happy Outcomes: Preparing to Succeed</p> <p>During class lessons students will be given tasks on converting binary and hexadecimal numbers.</p> <p>A subject commendation will be awarded to students who have consistently used feedback loops throughout the year.</p>
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Summer 2

Knowledge	<p>3.1 Computational Logic Students will practice the skills needed for the Controlled Assessment which will begin formally in Year 10.</p> <p>During this half term students will learn how to develop a report which covers the following:</p> <ul style="list-style-type: none"> • Success criteria • Planning and design • Development • Testing and remedial actions • Evaluation
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Skills	<ul style="list-style-type: none"> • Thinking abstractly • Thinking ahead • Thinking procedurally
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	<ul style="list-style-type: none">• Thinking logically• Thinking concurrently• Report writing• Python Programming skills
Assessment	<p>Marking Point 1: Practice CA – Planning using pseudocode and flow diagrams</p> <p>Marking Point 2: Practice CA – Deveopment of python code and Testing and action table</p> <p>Marking Point 3: Progress Test will be conducted during lesson and will cover the content from Summer 1. This will be 1.5 hours long and will be based on the paper which students will sit in Year 11.</p>
Cultural enrichment	<ul style="list-style-type: none">• Problem solving• See algorithms, process data and implementing in a chosen language
Character	<div style="display: flex; align-items: center;"><div style="margin-right: 20px;"> <small>Reflection</small></div><div style="margin-right: 20px;"> <small>Confidence</small></div><div><p>Happy Futures: Healthy, Happy & Successful! Students will be asked to reflect on progress tests and develop a PLC and action plan of revision over the summer, so they can start the new academic year with confidence. They will also reflect on their strengths and successes.</p></div></div>