Computer Science
Key Stage 4 Framework for Learning
Year 10 2017-2018: Successful Foundations

Syllabus:
GCSE Computer Science

Autumn 1	
Knowledge	**1.1 Systems architecture** Students will build their knowledge on the following areas: • The purpose of the CPU • Von Neumann • CPU components • Function of the CPU • Embedded systems **1.2 Memory** Students will build their knowledge on the following areas: • Ram V Rom • Purpose of Ram • Purpose of Rom • Virtual memory • Flash memory **1.3 Storage** Students will build their knowledge on the following areas: • Secondary Storage • Data Capacity • Common types of storage • Characteristics of storage
Skills	• Extended writing • Discuss the elements of a computer system • Describe the purpose of Ram/Rom • Explain the Von Neumann theory
Assessment	**Marking Point 1:** 2 x exam questions on the topic computer systems **Marking Point 2:** 3 x exam questions on the CPU **Marking Point 3:** 6 mark exam question of the fetch-decode-execute cycle
Cultural enrichment	• Understand the impacts of digital technology to the individual and to wider society • Valuable thinking skills that are extremely attractive in the modern workplace
Character	  **Happy Habits: New Beginnings & Organisation** Curiosity - students will learn how to take apart and put together a computer. This will be an excellent way for them to learn about the components of a computer.

	Students will need to be responsible, so as not to damage the equipment.

Autumn 2

Knowledge	**1.4 Wired and Wireless Networks** Students will build their knowledge on the following areas: • Types of networks • WAN/LAN • Performance factors • Client V peer-to-peer • Network hardware • WWW, DNS, hosting and the cloud • Virtual networks **1.5 Network Topologies, protocols and layers** Students will build their knowledge on the following areas: • Star and mesh • Wifi • Ethernet • IP, MAC and protocols • Layers • Packets **1.6 System Security** Students will build their knowledge on the following areas: • Forms of attack • Threats posed to networks • Identifying and preventing vulnerabilities
Skills	• Draw networks • Annotate diagrams • Recall rules of protocols • Be aware of the threats to system security • Extended writing
Assessment	**Marking Point 1:** 6 x exam questions on the topic network hardware **Marking Point 2:** 6 mark exam question on network policies
Cultural enrichment	• Security and risks of malicious attacks on networks • Network structure for homes and business
Character	 **Happy Communities: Conduct** Students will consider how infrastructures impact on the environment. Also they will consider the cultural divide and what people who live in the digital divide miss out on, because infrastructures can or have not been set up in their areas.

Spring 1

Knowledge	**1.7 System Software** Students will build their knowledge on the following areas: • Purpose and functions of system software • Utility system software **1.8 Ethical, Legal, Cultural and Environmental concerns** Students will build their knowledge on the following areas: • Ethical, legal, cultural, environmental and privacy issues • Stakeholders affected by tech

	• Environmental impact of Comp Sci • Open source V Propriety • Relevant Legislation
Skills	• 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
Assessment	**Marking Point 1:** 4 x exam questions on the topic Systems Software **Marking Point 2:** 4 x exam questions on ethical and cultural issues **Marking Point 3:** 2 x exam questions on open source and Proprietary Software.
Cultural enrichment	Students will complete their Home Learning on Doddle. They will have three Doddle home learning tasks this half term which will be assigned by the class teacher and be marked on the online system.
Character	 **Happy Resolutions: New Year, New You!** Students will need to show resiliency as they will be revising and preparing for their progress test, with guided challenging tasks to keep them on track.

Spring 2

Knowledge	**2.1 Algorithms** Students will build their knowledge on the following areas: • Computational thinking • Standard searching algorithms • Standard sorting algorithms • How to produce algorithms • Interpret, correct or complete algorithms **2.2 Programming Techniques** Students will build their knowledge on the following areas: • 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 **2.3 Producing robust programs** Students will build their knowledge on the following areas: • Defensive design considerations • Maintainability • Purpose of training • Types of testing • Syntax and logic errors • Selecting suitable test data
Skills	• Plan algorithms • Design and draw algorithms

	• Practice their programming skills by using 'Python' and online hosts such as 'Khan Academy' and 'Code Academy'
Assessment	**Marking Point 1:** Exam question on the stages on a linear search in context, plus 6 mark data flow diagram to show a mobile phone program. **Marking Point 2:** 5 x exam questions on defensive design.
Cultural enrichment	• The effect of Computational Thinking • Planning effective programs
Character	 **Happy Hearts & Minds: Cultural Capital** Students can create revision materials for themselves or the classroom display on these topics.

Summer 1

Knowledge	**2.4 Computational Logic** Students will build their knowledge on the following areas: • Binary representation • Logic diagrams • AND/OR/NOT • Truth tables • Mathematical operators **2.5 Translators and facilities of languages** Students will build their knowledge on the following areas: • Low and High level languages • Purpose of translators • Assembler, compiler and interpreter • IDE features and tools **2.6 Data Representation** Students will build their knowledge on the following areas: • Units • Numbers • Characters • Images • Sound • Compression
Skills	• Converting denary to binary • Calculating binary (additions) • Recognizing the difference between High and Low level languages • Confidentially using the tools in the Python IDE
Assessment	**Marking Point 1:** 2 x exam questions on input and output algorithms. **Marking Point 2:** 2 x exam questions on data representation. **Marking Point 3:** 6 mark exam question on lossless compression.
Cultural enrichment	• Changes to available software • Effective tools and features of available programming software
Character	

	  **Happy Outcomes: Preparing to Succeed** Students will be given tasks to start practicing python skills independently and will getting motivated to be successful in their upcoming practice and actual CA assignment.
Summer 2	
Knowledge	**3.1 Computational Logic** Students will practice the skills needed for the Controlled Assessment which will begin formally in Year 10. During this half term students will learn how to develop a report which covers the following: • Success criteria • Planning and design • Development • Testing and remedial actions • Evaluation
Skills	• Thinking abstractly • Thinking ahead • Thinking procedurally • Thinking logically • Thinking concurrently • Report writing • Python Programming skills
Assessment	**Marking Point 1:** Practice CA – Planning using pseudocode and flow diagrams **Marking Point 2:** Practice CA – Development of python code and Testing and action table
Cultural enrichment	• Problem solving • See algorithms, process data and implementing in a chosen language
Character	  **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. This will cover theory and practical skills.