

Curriculum Sequencing Grid: (KS4 - GCSE Computer Science)

Year 9	Term 1	Term 2	Term 3
Unit (Tablet in 39 week plan)	<ul style="list-style-type: none"> • Programming in Python • Principles of Programming 	<ul style="list-style-type: none"> • Software Engineering • Program Construction 	<ul style="list-style-type: none"> • HTML • Python Programming Project
Key Retainable Knowledge (Required for Y11/13) <ul style="list-style-type: none"> • What... How.... Why.... 	<ul style="list-style-type: none"> • Simple Logical Expressions • Identifying Programming Errors • String Manipulation • Data Structures • High V's Low Level Programming Languages 	<ul style="list-style-type: none"> • Integrated Development Environments • Translators • The Compilation Process • The theory of Programming Errors 	<ul style="list-style-type: none"> • Representation of Numbers • Character Sets • Representation of Graphics • Compression • Representation of Sound
Key Technical Vocabulary (To be modelled and deliberately practiced in context.)	<ul style="list-style-type: none"> • AND, OR, NOT • Syntax, Logical, Runtime • Concatenation • Tuple, Dictionary, Array • Machine Code • Assembly Language • High Level Code / Low Level Code 	<ul style="list-style-type: none"> • Linkers, Loaders, Debuggers, Trace, Break Point, Variable Watch, Memory inspector, Error diagnostics • Compilers, Interpreters, Assemblers • Lexical Analysis, Symbol Table Construction, Syntax Analysis, Semantic Analysis, Code Generation, Code Optimisation 	<ul style="list-style-type: none"> • Binary, Denary, Hexadecimal • Overflow, Underflow • Arithmetic Shifts • Colour Depth, Metadata • Sound Sampling, Amplitude, Sample Rate, Bit Depth • ASCII, Unicode • Lossy, Lossless Compression, Compression Ratios
Opportunities for Reading	<ul style="list-style-type: none"> • Revision Guide • Knowledge Organisers • Teach ICT • BBC Bitesize • Teach Computing • Code Academy • Code Combat • @maltbycab Twitter feed 	<ul style="list-style-type: none"> • Revision Guide • Knowledge Organisers • Teach ICT • BBC Bitesize • Teach Computing • @maltbycab Twitter feed 	<ul style="list-style-type: none"> • Revision Guide • Knowledge Organisers • Teach ICT • BBC Bitesize • Teach Computing • Code Academy • Code Combat • @maltbycab Twitter feed
Developing Cultural Capital (exposure to very best- essential knowledge and	<ul style="list-style-type: none"> • Bebras • Hour of Code • National Video Game Day 	<ul style="list-style-type: none"> • Cyber Discovery 	<ul style="list-style-type: none"> • Visit to Bletchley Park

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skills of educated citizens – appreciation of human creativity and achievement.)			
Cross Curricular Links (Authentic Connections)	<ul style="list-style-type: none"> • Maths – Number Skills • IT – E-safety/Cyber Security 	<ul style="list-style-type: none"> • Maths – Number Skills • IT – E-safety/Cyber Security 	<ul style="list-style-type: none"> • Maths – Number Skills • IT – E-safety/Cyber Security • Science – Signal Types
Key Assessment	<ul style="list-style-type: none"> • Theoretical programming • Practical programming end of topic assessment 	<ul style="list-style-type: none"> • Software Engineering end of topic assessment, interleaved with knowledge from term 1 • Program Construction end of topic assessment, interleaved with knowledge from term 1/2 	<ul style="list-style-type: none"> • HTML practical programming project • Python Programming Project, interleaved with knowledge from term 1/2

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Year 10	Term 1	Term 2	Term 3
Unit (Tablet in 39 week plan)	<ul style="list-style-type: none"> • Hardware • Networks 	<ul style="list-style-type: none"> • Logical Operations • Operating Systems 	<ul style="list-style-type: none"> • Security and Data Management • Legal, Ethical and Moral Issues
Key Retainable Knowledge (Required for Y11/13) <ul style="list-style-type: none"> • What... How.... Why.... 	<ul style="list-style-type: none"> • Von Neumann Architecture • Fetch Decode Execute cycle • Cores, Clock Speed • Instruction Sets • Input, Output, Storage Devices • Embedded Systems • Network types and topologies • Protocols 	<ul style="list-style-type: none"> • Truth Tables and Logic Gates • Boolean Algebra • Human Computer Interfaces • Operating System • Utility Software 	<ul style="list-style-type: none"> • Data Security • Cyber Security • Identifying Vulnerabilities • Protecting Software Systems
Key Technical Vocabulary (To be modelled and deliberately practiced in context.)	<ul style="list-style-type: none"> • Central Processing Unit • Controller, ALU, Registers, Cache • RISC, CISC • LAN, WAN • Bus, Ring, Star, Mesh • Packet, Circuit Switching • TCP/IP 	<ul style="list-style-type: none"> • AND, OR, NOT • Boolean Expressions • Graphical User Interface, Voice, Menu, Command Line, Touch • Virus Checker, Firewalls, Defragmentation, System Restore. 	<ul style="list-style-type: none"> • Passwords, Encryption, Backup, Archiving • Acceptable Use Policy • Disaster Recovery Policy • Malware • Shoulder Surfing, SQL injection, DoS attack, Password-based attacks, IP address spoofing, Social Engineering • Footprinting, Ethical Hacking, Penetration Testing
Opportunities for Reading	<ul style="list-style-type: none"> • Revision Guide • Knowledge Organisers • Teach ICT • BBC Bitesize • Teach Computing • @maltbycab Twitter feed 	<ul style="list-style-type: none"> • Revision Guide • Knowledge Organisers • Teach ICT • BBC Bitesize • Teach Computing • @maltbycab Twitter feed 	<ul style="list-style-type: none"> • Revision Guide • Knowledge Organisers • Teach ICT • BBC Bitesize • Teach Computing • @maltbycab Twitter feed

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<p>Developing Cultural Capital (exposure to very best- essential knowledge and skills of educated citizens – appreciation of human creativity and achievement.)</p>	<ul style="list-style-type: none"> • Bebras • Hour of Code • National Video Game Day 		<ul style="list-style-type: none"> • Cyber Discovery
<p>Cross Curricular Links (Authentic Connections)</p>	<ul style="list-style-type: none"> • Technology – Inventions and new technologies. 	<ul style="list-style-type: none"> • Maths – Number Skills 	<ul style="list-style-type: none"> • Lifeskills – Social and Moral Issues
<p>Key Assessment</p>	<ul style="list-style-type: none"> • End of unit Hardware assessment, interleaved with some key learning from previous year. • End of unit Network assessment interleaved with some key learning from previous year and term 1 	<ul style="list-style-type: none"> • End of unit Logical Operations assessment, interleaved with some key learning from previous year and term 1. • End of unit Operating Systems assessment interleaved with some key learning from previous year and term 1/2 	<ul style="list-style-type: none"> • End of unit Security and Data Management assessment, interleaved with some key learning from previous year and term 1/2. • End of unit Legal, Ethical and Moral Issues assessment interleaved with some key learning from previous year and term 1/2/3

Year 11	• Term 1	• Term 2	• Term 3
Unit (Tablet in 39 week plan)	<ul style="list-style-type: none"> Component 3 - NEA Component 2 	<ul style="list-style-type: none"> Component 1 Component 2 	<ul style="list-style-type: none"> Component 1 Component 2
Key Retainable Knowledge (Required for Y11/13) <ul style="list-style-type: none"> What... How.... Why.... 	<p>Component 2: Computational Thinking and Programming – 37.5%</p> <ul style="list-style-type: none"> On-screen examination: 2 hours. 60 marks. This component investigates problem solving, algorithms and programming constructs, programming languages, data structures and data types and security and authentication. <p>Component 3: NEA Software Development</p> <ul style="list-style-type: none"> Non-exam assessment: 20 hours. 80 marks. This component requires you to produce a programmed solution to a problem. You must analyse the problem, design a solution to the problem, develop a final programmed solution, test the solution and give suggestions for further development of the solution. Throughout the production of the solution you are required to produce a refinement log that evidences the development of the solution. 	<p>Component 1: Understanding Computer Science – 62.5%</p> <ul style="list-style-type: none"> Written examination: 1 hour 45 minutes. 100 marks. This component investigates hardware, logical operations, communication, data representation and data types, operating systems, principles of programming, software engineering, program construction, security and data management and the impacts of digital technology on wider society. <p>Component 2: Computational Thinking and Programming – 37.5%</p> <ul style="list-style-type: none"> On-screen examination: 2 hours. 60 marks. This component investigates problem solving, algorithms and programming constructs, programming languages, data structures and data types and security and authentication. 	<p>Component 1: Understanding Computer Science – 62.5%</p> <ul style="list-style-type: none"> Written examination: 1 hour 45 minutes. 100 marks. This component investigates hardware, logical operations, communication, data representation and data types, operating systems, principles of programming, software engineering, program construction, security and data management and the impacts of digital technology on wider society. <p>Component 2: Computational Thinking and Programming – 37.5%</p> <ul style="list-style-type: none"> On-screen examination: 2 hours. 60 marks. This component investigates problem solving, algorithms and programming constructs, programming languages, data structures and data types and security and authentication.

<p>Key Technical Vocabulary (To be modelled and deliberately practiced in context.)</p>	<p><u>Component 3 - NEA</u></p> <ul style="list-style-type: none"> • Scope of the Problem • Design • Refinement Log • Effectiveness of the Solution • Technical Quality • Test Strategy • Testing • Further Developments 	<p><u>Component 1</u></p> <ul style="list-style-type: none"> • Architecture • Input / Output • Primary/Secondary Storage • Storage Requirements • Hardware • Embedded Systems • Logical Operations/Operators • Boolean Logic • Networks • Internet • Representation of Numbers / Graphics / Sound • Storage of Characters • Data Types / Structures • File Design • Validation & Verification • Operating Systems • Managing Resources • Providing an Interface • Utility Software • Levels of Computer Language • Software Tools • Compilers, Interpreters, Assemblers • Security & Data Management • Compression • Network Security • Cybersecurity • Ethical, Legal and Environmental • Legislation • Environmental Issues 	<p><u>Component 1</u></p> <ul style="list-style-type: none"> • Architecture • Input / Output • Primary/Secondary Storage • Storage Requirements • Hardware • Embedded Systems • Logical Operations/Operators • Boolean Logic • Networks • Internet • Representation of Numbers / Graphics / Sound • Storage of Characters • Data Types / Structures • File Design • Validation & Verification • Operating Systems • Managing Resources • Providing an Interface • Utility Software • Levels of Computer Language • Software Tools • Compilers • Interpreters • Assemblers • Security & Data Management • Compression • Network Security • Cybersecurity • Ethical, Legal and Environmental • Legislation • Environmental Issues
	<p><u>Component 2</u></p> <ul style="list-style-type: none"> • Problem Solving • Algorithm & Programming Constructs • Algorithms • Programming Constructs • Variables • Identifiers • String Handling • Mathematical Operations • Logical Operations • Sorting • Searching • Testing and Evaluating • Programming Languages • Markup Language • Object Oriented Language • Assembly Language • Data Structures & Data Types • Implementing Data Structure • Implementing Data Types • Variables • Constants • Security & Authentication • Security Techniques 	<p><u>Component 2</u></p> <ul style="list-style-type: none"> • Problem Solving • Algorithm & Programming Constructs • Algorithms 	<p><u>Component 2</u></p>

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		<ul style="list-style-type: none"> • Programming Constructs • Variables • Identifiers • String Handling • Mathematical Operations • Logical Operations • Sorting • Searching • Testing and Evaluating • Programming Languages • Markup Language • Object Oriented Language • Assembly Language • Data Structures & Data Types • Implementing Data Structure • Implementing Data Types • Variables • Constants • Security & Authentication • Security Techniques 	<ul style="list-style-type: none"> • Problem Solving • Algorithm & Programming Constructs • Algorithms • Programming Constructs • Variables • Identifiers • String Handling • Mathematical Operations • Logical Operations • Sorting • Searching • Testing and Evaluating • Programming Languages • Markup Language • Object Oriented Language • Assembly Language • Data Structures & Data Types • Implementing Data Structure • Implementing Data Types • Variables • Constants • Security & Authentication • Security Techniques
Opportunities for Reading	<ul style="list-style-type: none"> • BBC BITESIZE • TEACH ICT • Twitter 	<ul style="list-style-type: none"> • BBC BITESIZE • TEACH ICT • Twitter 	<ul style="list-style-type: none"> • BBC BITESIZE • TEACH ICT • Twitter
Developing Cultural Capital (exposure to very best- essential knowledge and skills of educated citizens – appreciation of human creativity and achievement.)	<ul style="list-style-type: none"> • Bebras • Hour of Code 	<ul style="list-style-type: none"> • Bebras • Hour of code 	<ul style="list-style-type: none"> • Bebras • Hour of code

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<p>Cross Curricular Links (Authentic Connections)</p>	<ul style="list-style-type: none"> • Maths – Boolean Operations, Boolean Algebra, Binary, Hexadecimal and Denary conversation, Arithmetic Shift 	<ul style="list-style-type: none"> • Maths – Boolean Operations, Boolean Algebra, Binary, Hexadecimal and Denary conversation, Arithmetic Shift 	<ul style="list-style-type: none"> • Maths – Boolean Operations, Boolean Algebra, Binary, Hexadecimal and Denary conversation, Arithmetic Shift
<p>Key Assessment</p>	<ul style="list-style-type: none"> • Component 3 – NEA: • Requirements to submit work electronically but no official marking or feedback required or received from the exam board. • Component 2 • Spa & CTG questions throughout teaching of the topic • Mock on screen exam (30 mins) • Actual exam 14th May 2020 	<ul style="list-style-type: none"> • Component 1 • Spa & CTG questions throughout teaching of the topic • Mock exam • Actual exam 11th May 2020 • Component 2 • Spa & CTG questions throughout teaching of the topic • Mock on screen exam (30 mins) • Actual exam 14th May 2020 	<ul style="list-style-type: none"> • Component 1 • Spa & CTG questions throughout teaching of the topic • Mock exam • Actual exam 11th May 2020 • Component 2 • Spa & CTG questions throughout teaching of the topic • Mock on screen exam (30 mins) • Actual exam 14th May 2020