

Yr12 (KS5)	Topic Area	Knowledge/Skills that are taught	Knowledge/Skills revisited	What does good look like?	Resources/support at home
Autumn 1	Unit 1: Fundamentals of programming	Topic 1: Programming basics Topic 2: Selection Topic 3: Iteration Topic 4: Arrays Topic 5: Subroutines Topic 6: Files and exception handling	KS3 Introduction to coding through Kodu Games programming in Scratch Introduction to Python AI and machine learning Computational thinking and logic Python: Next steps Y7 Spring 2 Y7 Summer 2 Y8 Aut1 Y8 Spring 1 Y8 Spring 2 Y9 Aut2 Y9 Spring1 KS4 CS Programming KS5 CS Programming	<ul style="list-style-type: none"> • explain the difference between a variable and a constant • write a pseudocode solution for a simple problem involving iteration and selection • use nested selection and iteration statements • use arithmetic operations and Boolean operations NOT, AND and OR • use functions and library subroutines including random number generation • know how to define and call a subroutine in a program 	Google classroom PG Online https://www.pgonline.co.uk/resources/computer-science/a-level-aga/ Replit https://replit.com/ AQA AS and A Level Computer Science Textbook PM Heathcote and RSU Heathcote ISBN: 978-1-910523-07-0

				<ul style="list-style-type: none"> • construct algorithms using one-dimensional arrays • read from and write to a simple text file 	
Autumn 2	Unit 3: Data representation	<p>Topic 1: Number systems</p> <p>Topic 2: Bits, bytes and binary</p> <p>Topic 3: Binary arithmetic</p> <p>Topic 4: Bitmapped graphics</p> <p>Topic 5: Representation of sound</p> <p>Topic 6: Compression and encryption algorithms</p>	<p>KS3</p> <p>Understanding computers</p> <p>Graphics</p> <p>Sound</p> <p>KS4</p> <p>Systems architecture</p>	<ul style="list-style-type: none"> • convert between decimal, binary and hexadecimal number systems • define bits and bytes, and use names, symbols and prefixes appropriately • know how to use the ASCII table • use arithmetic operations and Boolean operations NOT, AND and OR • know how simple error checking methods are used in transmission • know how to add and multiply two unsigned binary numbers • convert between signed binary and decimal • explain how images are represented in terms of pixels, 	<p>Google classroom</p> <p>PG Online</p> <p>https://www.pgonline.co.uk/resources/computer-science/a-level-aga/</p> <p>Replit</p> <p>https://replit.com/</p> <p>AQA AS and A Level Computer Science Textbook</p> <p>PM Heathcote and RSU Heathcote</p> <p>ISBN: 978-1-910523-07-0</p>

				<ul style="list-style-type: none"> resolution and colour depth know the function of an analogue to digital convertor know what MIDI and event message are used for use basic encryption to create ciphertext 	
Spring 1	Unit 2: Problem solving and theory of computation	<p>Topic 1: Solving logic problems</p> <p>Topic 2: Structured programming</p> <p>Topic 3: Writing and interpreting algorithms</p> <p>Topic 4: Testing</p> <p>Topic 5: Abstraction and automation</p> <p>Topic 6: Finite state machines</p>	<p>Building on KS2 knowledge</p> <p>Y7 Spring 2</p> <p>Y7 Summer 2</p> <p>Y8 Aut1</p> <p>Y8 Spring 1</p> <p>Y8 Spring 2</p> <p>Y9 Aut2</p> <p>Y9 Spring1</p> <p>KS4 CS Programming</p> <p>KS4 CS Fundamentals of algorithms</p>	<ul style="list-style-type: none"> check solutions to simple logic problems interpret a hierarchy chart for a given problem list three basic programming structures list two benefits of structured programming techniques interpret simple algorithms to describe their purpose list two features of a good algorithm describe how a bubble sort works describe how a binary search works describe what is meant by normal, 	<p>Google classroom</p> <p>PG Online</p> <p>https://www.pgonline.co.uk/resources/computer-science/a-level-aqa/</p> <p>Replit</p> <p>https://replit.com/</p> <p>AQA AS and A Level Computer Science Textbook</p> <p>PM Heathcote and RSU Heathcote</p> <p>ISBN: 978-1-910523-07-0</p>

				<ul style="list-style-type: none"> boundary and invalid data and use them in a test plan Give examples of some types of abstraction, e.g. information hiding, procedural and functional abstraction identify the symbols used in an automaton and say whether a string is accepted by it 	
Spring 2	Unit 4: Hardware and software	<p>Topic 1: Hardware and software</p> <p>Topic 2: Role of an operating system</p> <p>Topic 3: Programming language classification</p> <p>Topic 4: Programming language translators</p> <p>Topic 5: Logic gates</p> <p>Topic 6: Boolean algebra</p>	<p>KS3 Understanding computers</p> <p>KS4 Systems architecture</p>	<ul style="list-style-type: none"> define the terms hardware and software and explain the relationship between them Explain what is meant by system software and application software Describe some of the functions of operating systems and utility programs State with examples what is meant by high- and low-level languages Identify machine code and assembly code 	<p>Google classroom PG Online</p> <p>https://www.pgonline.co.uk/resources/computer-science/a-level-aga/</p> <p>Replit https://replit.com/</p> <p>AQA AS and A Level Computer Science Textbook PM Heathcote and RSU Heathcote ISBN: 978-1-910523-07-0</p>

				<ul style="list-style-type: none"> as low-level languages • Explain why program translators are needed • Explain the difference between source and object code • Interpret simple assembly code programs • construct truth tables for a variety of logic gates • draw and interpret logic gate circuit diagrams involving multiple gates • write a Boolean expression for a given logic gate circuit • draw an equivalent logic gate circuit for a given Boolean expression 	
Summer 1	Unit 5: Computer organisation and architecture	Topic 1: Internal computer hardware Topic 2: The processor Topic 3: The processor instruction set Topic 4: Assembly language Topic 5: Input - output devices Topic 6: Secondary storage devices	KS3 Understanding computers KS4 Systems architecture	<ul style="list-style-type: none"> • list the basic internal components of a computer system • describe the concept of addressable memory and the stored program concept 	Google classroom PG Online https://www.pgonline.co.uk/resources/computer-science/a-level-aqa/

				<ul style="list-style-type: none"> define the term 'processor instruction set' describe an instruction as consisting of an opcode and an operand, where an operand could be a value, a memory address or a register interpret simple assembly code instructions with immediate and direct addressing modes be able to use given assembly language instruction formats to write instructions to perform simple tasks understand the main characteristics and purpose of a range of input and output devices explain the need for secondary storage within a computer system 	<p>Replit https://replit.com/</p> <p>AQA AS and A Level Computer Science Textbook PM Heathcote and RSU Heathcote ISBN: 978-1-910523-07-0</p>
Summer 2	Unit 6: Communication: Technology and consequences	Topic 1: Communication methods Topic 2: Network topology Topic 3: Client-server and peer-to-peer	KS3 Networks KS4	<ul style="list-style-type: none"> Define serial and parallel transmission methods 	<p>Google classroom PG Online</p>

Computer Science KS5 A Level Curriculum Map

		<p>Topic 4: Wireless networking, CSMA and SSID</p> <p>Topic 5: Communication and privacy</p> <p>Topic 6: The challenges of the digital age</p>	<p>Computer networks and connections</p>	<ul style="list-style-type: none"> • Define synchronous and asynchronous data transmission • Define: baud rate, bit rate, bandwidth, latency, protocol • Draw diagrams of star and bus network topologies and give advantages and disadvantages of each • Give examples of where peer-to-peer and client-server networking might be used • Give examples of organisations that amass and analyse personal information • Explain, with examples, how some software applications have resulted in great benefits but also caused great harm • Give examples of algorithms that embed moral and cultural values, and that may cause harm or injustice 	<p>https://www.pgonline.co.uk/resources/computer-science/a-level-aga/</p> <p>Replit https://replit.com/</p> <p>AQA AS and A Level Computer Science Textbook PM Heathcote and RSU Heathcote ISBN: 978-1-910523-07-0</p>
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Yr13 (KS5)	Topic Area	Knowledge/Skills that are taught	Knowledge/Skills revisited	What does good look like?	Resources/support at home
Autumn 1	Unit 7: Data structures	Topic 1: Queues Topic 2: Lists Topic 3: Stacks Topic 4: Hash tables and dictionaries Topic 5: Graphs Topic 6: Trees Topic 7: Vectors	KS3 Control system with Flowol Introduction to Python Computational thinking and logic Python: Next steps AI and machine learning Games programming in Scratch Introduction to coding through Kodu KS4 Fundamentals of algorithms Programming	<ul style="list-style-type: none"> describe the concept and uses of a queue, stack, list, graph, tree, hash table, dictionary and vector describe typical uses of these data structures define a rooted tree and a binary tree be able to apply a simple hashing algorithm describe what is meant by a collision and how collisions are handled using rehashing perform vector addition and scalar multiplication 	Google classroom PG Online https://www.pgonline.co.uk/resources/computer-science/a-level-aga/ Replit https://replit.com/ AQA AS and A Level Computer Science Textbook PM Heathcote and RSU Heathcote ISBN: 978-1-910523-07-0
Autumn 1	Non-exam assessment - the computing practical project	Analysis (9) Design (12) Technical Solution (42) Testing (8) Evaluation (4) Total (75)	KS3 Control system with Flowol Introduction to Python Computational thinking and logic Python: Next steps AI and machine learning Games programming in Scratch Introduction to coding through Kodu	The project allows students to develop their practical skills in the context of solving a realistic problem or carrying out an investigation. The project is intended to be as much a learning experience as a method	Google classroom PG Online https://www.pgonline.co.uk/resources/computer-science/a-level-aga/ Replit https://replit.com/

			<p>KS4 Fundamentals of algorithms Programming</p> <p>KS5 Units 1, 2, 7, 8, 9, 11, 12</p>	<p>of assessment; students have the opportunity to work independently on a problem of interest over an extended period, during which they can extend their programming skills and deepen their understanding of computer science.</p>	<p>AQA AS and A Level Computer Science Textbook PM Heathcote and RSU Heathcote ISBN: 978-1-910523-07-0</p> <p>Zig Zag A level AQA NEA Companion</p> <p>Tackling A Level projects in Computer Science AQA 7517 ISBN: 978-1-910523-20-9</p>
Autumn 1	Unit 8: Algorithms	<p>Topic 1: Recursive algorithms</p> <p>Topic 2: Big-O Notation Searching and sorting</p> <p>Topic 3: Searching and sorting</p> <p>Topic 4: Graph traversal algorithms</p> <p>Topic 5: Optimisation algorithms</p>	<p>KS3 Control system with Flowol Introduction to Python Computational thinking and logic Python: Next steps AI and machine learning Games programming in Scratch Introduction to coding through Kodu</p> <p>KS4 Fundamentals of algorithms Programming</p>	<ul style="list-style-type: none"> state the essential characteristics of a recursive algorithm insert items into a binary search tree state the order in which nodes are visited in pre-order, in-order and post-order tree traversals give examples of linear, polynomial, exponential and logarithmic functions 	<p>Google classroom PG Online</p> <p>https://www.pgonline.co.uk/resources/computer-science/a-level-aqa/</p> <p>Replit https://replit.com/</p> <p>AQA AS and A Level Computer Science Textbook PM Heathcote and RSU Heathcote</p>

				<ul style="list-style-type: none"> • compare two algorithms in terms of efficiency • explain the principles of a linear and binary search • state a possible order in which nodes are visited in depth first and breadth first graph traversals • state applications of each graph traversal • state the purpose and applications of Dijkstra's shortest path algorithm • Describe the Travelling Salesman problem • Explain what is meant by a tractable or intractable problem 	ISBN: 978-1-910523-07-0
Autumn 2	Unit 9: Regular languages	Topic 1: Mealy machines Topic 2: Sets Topic 3: Regular expressions Topic 4: The Turing machine Topic 5: Backus-Naur form Topic 6: Reverse Polish notation	KS3 Control system with Flowol Introduction to Python Computational thinking and logic Python: Next steps AI and machine learning Games programming in Scratch Introduction to coding through Kodu	<ul style="list-style-type: none"> • Interpret finite state machines with and without output • Define a set by listing its members • Calculate a subset, membership, union, intersection, and difference of given sets 	Google classroom PG Online https://www.pgonline.co.uk/resources/computer-science/a-level-aga/ Replit https://replit.com/

			<p>KS4 Fundamentals of algorithms Programming</p>	<ul style="list-style-type: none"> Form and use simple regular expressions for string manipulation and matching Explain the structure of a simple Turing machine. Read BNF production rules and validate input strings. Convert simple infix form to Reverse Polish Notation and vice versa 	<p>AQA AS and A Level Computer Science Textbook PM Heathcote and RSU Heathcote ISBN: 978-1-910523-07-0</p>
Autumn 2	Unit 12: OOP and functional programming	<p>Topic 1: Basic concepts of Object Oriented Programming Topic 2: Object oriented design principles Topic 3: Functional programming Topic 4: Function application Topic 5: Lists in functional programming Topic 6: Big Data</p>	<p>KS3 Control system with Flowol Introduction to Python Computational thinking and logic Python: Next steps AI and machine learning Games programming in Scratch Introduction to coding through Kodu</p> <p>KS4 Fundamentals of algorithms Programming</p>	<ul style="list-style-type: none"> draw and interpret a class diagram explain what is meant by inheritance and polymorphism interpret and correct a simple object-oriented program explain why the object-oriented paradigm is used state the meaning of the domain and co-domain of a function give examples of first-class objects in a functional 	<p>Google classroom PG Online</p> <p>https://www.pgonline.co.uk/resources/computer-science/a-level-aga/</p> <p>Replit https://replit.com/</p> <p>AQA AS and A Level Computer Science Textbook PM Heathcote and RSU Heathcote</p>

				<p>programming language</p> <ul style="list-style-type: none"> • write and interpret simple functions in Haskell • evaluate simple functions involving map, filter, reduce or fold • describe and apply list operations such as return head or tail of a list, create/test for empty list, append and prepend an item to a list • describe what is meant by immutable data structures • state the distinguishing features of Big Data: volume, velocity and variety • identify nodes, edges and properties in graph schema 	ISBN: 978-1-910523-07-0
Autumn 2	Non-exam assessment - the computing practical project	See above	See above	See above	See above
Spring 1	Non-exam assessment - the computing practical project	See above	See above	See above	See above

Computer Science KS5 A Level Curriculum Map

Spring 1	Unit 11: Databases and software development	Topic 1: Entity relationship modelling Topic 2: Relational databases and normalisation Topic 3: Introduction to SQL Topic 4: Defining and updating tables using SQL Topic 5: Systematic approach to problem solving	KS3 Database development KS4 Relational databases and SQL	<ul style="list-style-type: none"> • write an entity description for each entity in a database • define the terms attribute, primary key, composite primary key and foreign key • produce a simple entity relationship diagram involving two or three entities • use SQL to retrieve, update, insert and delete data from a single table • state what is meant by a client-server database • state a problem that can arise from concurrent access on a client-server database and name a method for overcoming it • list tasks performed by an analyst and a designer during system design 	<p>Google classroom PG Online</p> <p>https://www.pgonline.co.uk/resources/computer-science/a-level-aqa/</p> <p>Replit https://replit.com/</p> <p>AQA AS and A Level Computer Science Textbook PM Heathcote and RSU Heathcote ISBN: 978-1-910523-07-0</p>
Spring 2	Unit 10: The Internet	Topic 1: Structure of the Internet Topic 2: Packet switching and routers Topic 3: Internet security Topic 4: TCP/IP, standard application layer protocols Topic 5: IP addresses	KS3 Networks KS4 Cyber security Computer networks and connections	<ul style="list-style-type: none"> • Understand the structure of the Internet • Describe the term 'Uniform Resource Locator' in the context of networking 	<p>Google classroom PG Online</p> <p>https://www.pgonline.co.uk/resources/computer-science/a-level-aqa/</p>

		<p>Topic 6: Client server model</p>		<ul style="list-style-type: none"> • Explain the terms 'domain name' and 'IP address' • Understand the purpose and function of the Domain Name Server (DNS) system • Understand the role of packet switching and routers • Consider where and why routers and gateways are used • Understand how a firewall works • Explain symmetric and asymmetric encryption and key exchange • Discuss worms, Trojans and viruses and the vulnerabilities that they exploit • Discuss how improved code quality, monitoring and protection can be used against such threats • Describe the roles of the four layers in the TCP/IP protocol stack • Describe the role of sockets in the TCP/IP stack 	<p>uter-science/a-level-aqa/</p> <p>Replit https://replit.com/</p> <p>AQA AS and A Level Computer Science Textbook PM Heathcote and RSU Heathcote ISBN: 978-1-910523-07-0</p>
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Summer 1	Revision/Exams	Revision/Exams	Revision/Exams	Revision/Exams	Revision/Exams
Summer 2	Revision/Exams	Revision/Exams	Revision/Exams	Revision/Exams	Revision/Exams