

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 construct algorithms using one-dimensional arrays read from and write to a simple text file 	Google classroom PG Online https://www.pgonline.co.uk/resources/computer-science/a-level-aqa/ Replit https://replit.com/ AQA AS and A Level Computer Science Textbook PM Heathcote and RSU Heathcote ISBN: 978-1-910523-07-0
Autumn 2	Unit 3: Data representation	Topic 1: Number systems Topic 2: Bits, bytes and binary Topic 3: Binary arithmetic Topic 4: Bitmapped graphics Topic 5: Representation of sound Topic 6: Compression and encryption algorithms	KS3 Understanding computers Graphics Sound KS4 Systems architecture	<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 	Google classroom PG Online https://www.pgonline.co.uk/resources/computer-science/a-level-aqa/ Replit https://replit.com/

				<p>binary numbers</p> <ul style="list-style-type: none"> • convert between signed binary and decimal • explain how images are represented in terms of pixels, 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 	<p>AQA AS and A Level Computer Science Textbook PM Heathcote and RSU Heathcote ISBN: 978-1-910523-07-0</p>
Spring 1	Unit 2: Problem solving and theory of computation	<p>Topic 1: Solving logic problems Topic 2: Structured programming Topic 3: Writing and interpreting algorithms Topic 4: Testing Topic 5: Abstraction and automation Topic 6: Finite state machines</p>	<p>Building on KS2 knowledge Y7 Spring 2 Y7 Summer 2 Y8 Aut1 Y8 Spring 1 Y8 Spring 2 Y9 Aut2 Y9 Spring1 KS4 CS Programming 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, 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 	<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 4: Hardware and software	Topic 1: Hardware and software Topic 2: Role of an operating system Topic 3: Programming language classification Topic 4: Programming language translators Topic 5: Logic gates Topic 6: Boolean algebra	KS3 Understanding computers KS4 Systems architecture	<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 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 	<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>
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	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 • define the term 'processor instruction set' • describe an instruction as consisting of an opcode and an operand, where an operand 	<p>Google classroom PG Online</p> <p>https://www.pgonline.co.uk/resources/computer-science/a-level-aqa/</p>

		<p>devices</p> <p>Topic 6: Secondary storage devices</p>		<p>could be a value, a memory address or a register</p> <ul style="list-style-type: none"> • 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>
<p>Summer 2</p>	<p>Unit 6: Communication: Technology and consequences</p>	<p>Topic 1: Communication methods</p> <p>Topic 2: Network topology</p> <p>Topic 3: Client-server and peer-to-peer</p> <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>KS3 Networks</p> <p>KS4 Computer networks and connections</p>	<ul style="list-style-type: none"> • Define serial and parallel transmission methods • 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 	<p>Google classroom</p> <p>PG Online 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>

				moral and cultural values, and that may cause harm or injustice	
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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-aqa/ 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	Analysis (9) Design (12) Technical Solution (42) Testing (8)	KS3 Control system with Flowol Introduction to	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 of assessment; students	Google classroom PG Online https://www.pgonline

	project	Evaluation (4) Total (75)	<p>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> <p>KS5 Units 1, 2, 7, 8, 9, 11, 12</p>	<p>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>.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> <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 Topic 2: Big-O Notation Searching and sorting Topic 3: Searching and sorting Topic 4: Graph traversal</p>	<p>KS3 Control system with Flowol Introduction to Python Computational thinking and logic</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 compare two algorithms in terms of efficiency 	<p>Google classroom PG Online</p> <p>https://www.pgonline.co.uk/resources/computer-science/a-level-aqa/</p>

		<p>algorithms Topic 5: Optimisation algorithms</p>	<p>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"> 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 	<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>
Autumn 2	Unit 9: Regular languages	<p>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</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>	<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 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>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-</p>

			KS4 Fundamentals of algorithms Programming		07-0
Autumn 2	Unit 12: OOP and functional programming	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	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"> 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 programming language 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 	<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>
Autumn 2	Non-exam assessment - the computing practical project	See above	See above	See above	See above
Spring 1	Non-exam	See above	See above	See above	See above

	assessment - the computing practical project				
Spring 1	Unit 11: Databases and software development	<p>Topic 1: Entity relationship modelling</p> <p>Topic 2: Relational databases and normalisation</p> <p>Topic 3: Introduction to SQL</p> <p>Topic 4: Defining and updating tables using SQL</p> <p>Topic 5: Systematic approach to problem solving</p>	<p>KS3 Database development</p> <p>KS4 Relational databases and SQL</p>	<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</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>
Spring 2	Unit 10: The Internet	<p>Topic 1: Structure of the Internet</p> <p>Topic 2: Packet switching and routers</p> <p>Topic 3: Internet security</p> <p>Topic 4: TCP/IP, standard application layer protocols</p> <p>Topic 5: IP addresses</p> <p>Topic 6: Client server model</p>	<p>KS3 Networks</p> <p>KS4 Cyber security</p> <p>Computer networks and connections</p>	<ul style="list-style-type: none"> Understand the structure of the Internet Describe the term 'Uniform Resource Locator' in the context of networking 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 	<p>Google classroom</p> <p>PG Online</p> <p>https://www.pgonline.co.uk/resources/computer-science/a-level-aqa/</p> <p>Replit</p>

				<ul style="list-style-type: none"> • 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 • Be familiar with MAC addresses • Be familiar with transferring files using FTP as an anonymous and non-anonymous user • Know that an IP address is split into a network identifier and a host identifier part • Know that there are currently two standards of IP address, (v4 and v6) and why v6 was introduced • Distinguish between routable and non-routable IP addresses • Be familiar with the client server model • Compare and contrast thin-client computing with thick-client computing 	https://replit.com/ AQA AS and A Level Computer Science Textbook PM Heathcote and RSU Heathcote ISBN: 978-1-910523-07-0
Summer 1	Revision/Exams	Revision/Exams	Revision/Exams	Revision/Exams	Revision/Exams
Summer 2	Revision/Exams	Revision/Exams	Revision/Exams	Revision/Exams	Revision/Exams