

GFS COMPUTING		Year 7	Year 8	Year 9	Year 10	Year 11
Overall theme for strands	Computer Science	COMPUTER SYSTEMS: How can we design the fastest computer system in the World?	COMPUTING HARDWARE: How can we design the fastest computer system in the World?	INTERMEDIATE SPREADSHEET MODELLING: Can we accurately model the world using computer software?	ALGORITHMS/ PROGRAMMING: How can we think more like a computer?	PROGRAMMING THEORY: How can we produce robust programs which are effective and efficient?
		INTRO TO PROGRAMMING: Can a computer be more intelligent than the human who programmed it?	EFFICIENT PROGRAMMING: What is more important, hardware or software?	CYBER SECURITY: Why is our data so valuable to hackers?	SYSTEMS ARCHITECTURE: Is there anything more important than a CPU inside a Computer?	PROGRAMMING PRACTICE TASK
		E-SAFETY / GRAPHIC DESIGN: Are we ever safe online?	INTRO TO SPREADSHEETS: Can we accurately model the world using computer software?	EFFICIENT PROGRAMMING PART II: How can we solve problems with efficient programs?	WIRED AND WIRELESS NETWORKS: How can we guarantee that a data packet will reach its destination?	CONTROLLED ASSESSMENT: (COMP 3 Programming Project) Jan-May HT
	IT	INTRO TO PROGRAMMING PART II: How can we solve problems with programs?	NETWORKS: Will the Internet slow down as it grows bigger and gets older?	ETHICAL, LEGAL, CULTURAL AND ENVIRONMENTAL CONCERNS: Have computers made the world better or worse?	SYSTEMS SOFTWARE: Which software is most important at an intelligence agency such as MI5 or the CIA?	DATA REPRESENTATION /REVISION: Is there anything we cannot represent using 0's and 1's?
	Digital Literacy	THEORY REVISION	BUILDING A WEBPAGE: Will the Internet slow down as it grows bigger and gets older?	GRAPHICS: How can we manipulate images in 2D and 3D?	SQL: How can we query a large data set using a programming language?	REVISION: Examination preparation
Term 1		<p><b>Topic:</b> Computer Systems</p> <p><b>Fertile Question:</b> How can we design the fastest computer system in the World?</p> <p><b>Content:</b></p> <p><b>Admin:</b></p> <ul style="list-style-type: none"> <li>-Usernames/Passwords/Email/Google Classroom</li> </ul> <p><b>Intro to</b></p> <ul style="list-style-type: none"> <li>- IT Skills: File management, shortcuts, saving</li> <li>- Input</li> <li>- Output</li> <li>- Memory: RAM/ROM</li> <li>- CPU</li> <li>- Secondary Storage</li> <li>- Von Neumann Architecture</li> </ul> <p><b>Theory assessment:</b> Analyse a computer system</p>	<p><b>Topic:</b> Computing Hardware</p> <p><b>Fertile Question:</b> How can we design the fastest computer system in the World?</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>- Computer Systems (Von Neumann Architecture)</li> <li>- CPU Instruction Cycle</li> <li>- Clock speed, Cores, Cache</li> <li>- Logic Gates</li> <li>- Logic Circuits</li> </ul> <p><b>Theory assessment:</b> CPU and Logic questions from OCR GCSE Computing Unit 2.1.2</p>	<p><b>Topic:</b> Intermediate spreadsheet modelling:</p> <p><b>Fertile Question:</b> Can we accurately model the world using computer software?</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>- Recap: Formula, IF, Functions</li> <li>- 3D Referencing</li> <li>- Conditional Formatting</li> <li>- Goal Seek</li> <li>- VLOOKUP</li> <li>- Graphic Design tasks with sources table</li> </ul> <p><b>Practical assessment:</b> Greenwich DVDs Spreadsheet</p>	<p><b>Topic:</b> Algorithms / Programming Techniques</p> <p><b>Fertile Question:</b> How can we think more like a computer?</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>- Computational Thinking</li> <li>- Searching Algorithms</li> <li>- Sorting Algorithms</li> <li>- Pseudo Code and Flowcharts</li> <li>- Sequence, Selection and Iteration using programming challenges (OCR / GSA)</li> <li>- String Manipulation recap</li> <li>- Arrays recap and 2D arrays</li> <li>- Functions and procedures recap</li> <li>- Combining data types</li> </ul> <p><b>Theory assessment:</b> Algorithms and Programming techniques questions from OCR GCSE Computer Science Unit 2.1 and 2.2</p>	<p><b>Topic:</b> Programming techniques 2 / Producing robust programs / Translators and Facilities of languages</p> <p><b>Fertile Question:</b> How can we produce robust programs which are effective and efficient?</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>- Defensive design</li> <li>- Maintainability</li> <li>- Testing</li> <li>- Identifying Syntax and Logic Errors</li> <li>- Selecting and using suitable test data</li> <li>- Practical: Exponentiation, MOD, DIV</li> <li>- Different languages incl low level recap</li> <li>- Translators</li> <li>- Assembler, Compiler and Interpreter</li> <li>- Tools and facilities of an IDE</li> </ul> <p><b>Theory assessment:</b> Programming questions from OCR GCSE Computer Science Unit 2.1, 2.2, 2.3, 2.4 and 2.5</p>
	Term 2	<p><b>Topic:</b> Intro to Programming Part I</p> <p><b>Fertile Question:</b> Can a computer be more intelligent than the human who programmed it?</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>Lyrics and Chatbot</li> <li>- Algorithms</li> <li>- Sequence</li> <li>- Selection</li> <li>- Computational Thinking</li> <li>- Quiz</li> <li>- Christmas Quiz Lists</li> </ul> <p><b>Practical assessment:</b> Creating a chatbot about GFS</p>	<p><b>Topic:</b> Efficient Programming</p> <p><b>Fertile Question:</b> What type of problems are quicker to solve by writing a program and what type of problems are slower to solve?</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>- Parking meter software</li> <li>- Sequence/Selection/Iteration</li> <li>- Modules (time, random, turtle)</li> <li>- Procedures</li> <li>- Capital Cities Quiz</li> <li>- String Manipulation</li> <li>- Buffer: Functions</li> </ul> <p><b>Practical assessment:</b> Creating a program which simulates an ATM (Cash machine)</p>	<p><b>Topic:</b> Cyber Security</p> <p><b>Fertile Question:</b> Why is our data so valuable to hackers?</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>- Malware</li> <li>- Bloatware</li> <li>- Viruses and Trojans</li> <li>- Spam, Phishing, RATS</li> <li>- Skimming</li> </ul> <p>Cyber Security Presentation</p> <ul style="list-style-type: none"> <li>- Ethical, Legal, Cultural and Environmental Concerns</li> <li>- Sources Table</li> </ul> <p><b>Theory and practical assessment:</b> Cyber security presentation</p>	<p><b>Topic:</b> Systems Architecture</p> <p><b>Fertile Question:</b> Is there anything more important than a CPU inside a Computer?</p> <p><b>Content:</b></p> <p>Systems Architecture</p> <ul style="list-style-type: none"> <li>- CPU Recap: Instruction cycle, performance</li> <li>- Von Neumann architecture revisited</li> <li>- CPU components and their function using LMC</li> <li>- Embedded systems</li> <li>- Memory Recap: RAM, ROM, Virtual memory, Flash memory</li> <li>- Storage Recap: Magnetic, Optical, Solid State, Justifying choices incl cost</li> </ul> <p><b>Theory assessment:</b> Algorithms and Programming technique questions from OCR GCSE Computer Science Units 1.1, 1.2 and 1.3</p>	<p><b>Topic:</b> Programming practice task</p> <p><b>Fertile Question:</b> N/A</p> <p><b>Content:</b></p> <p>Pupils will prepare for and complete a practice controlled assessment element of the specification. This includes:</p> <ul style="list-style-type: none"> <li>- Programming techniques</li> <li>- Design</li> <li>- Development</li> <li>- Testing, Evaluation and Conclusion</li> </ul> <p><b>Practical assessment:</b> Assessing the Design strand of the practice task</p>

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<p style="text-align: center; font-size: 24pt; font-weight: bold;">Term 3</p>	<p><b>Topic:</b> Online Safety/Multimedia Design</p> <p><b>Fertile Question:</b> To what extent is the online world more dangerous than the offline world?</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>- Usernames/Passwords/Email/Google Classroom</li> <li>- E-Safety videos</li> <li>- Sexting</li> <li>- Multimedia Presentation welcoming guests and new students to GFS. Must also include e-safety , digital citizenship or digital identity.</li> <li>- Sources Table</li> </ul> <p><b>Practical assessment:</b> Evaluation of E-safety posters</p>	<p><b>Topic:</b> Intro to spreadsheets</p> <p><b>Fertile Question:</b> Can we accurately model the world using computer software?</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>- Basic Formula</li> <li>- Functions</li> <li>- Graphs and Charts</li> <li>- If statements</li> <li>- Graphic Design tasks with sources table</li> </ul> <p><b>Practical assessment:</b> Aircraft booking system</p>	<p><b>Topic:</b> Efficient Programming Part II</p> <p><b>Fertile Question:</b> How can we write programs that never fail or crash?</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>- Cyber Security Quiz / Maths Quiz/Piggy Bank</li> <li>- Algorithms -&gt;Flowcharts and Pseudocode</li> <li>- Exception handling</li> <li>- String manipulation</li> <li>- Procedures</li> <li>- Functions</li> </ul> <p><b>Practical assessment:</b> Pizza Program</p>	<p><b>Topic:</b> Wired and Wireless Networks and Topologies</p> <p><b>Fertile Question:</b> How can we guarantee that your data (passwords, personal information and snapchat photos) are not hacked when travelling across a network?</p> <p><b>Content:</b></p> <p>Networks recap</p> <ul style="list-style-type: none"> <li>- LAN vs WAN</li> <li>- Hardware: WAPS, Routers, Switches, NICS, Transmission Media</li> <li>- Factors affecting performance</li> <li>- Roles of computers in client server, p2p</li> <li>- The Internet-DNS, Hosting, Cloud</li> <li>- Virtual networks</li> <li>- Star and Mesh</li> <li>- Wifi-freq, channels and encryption</li> <li>- IP/ MAC Addresssubg and Protocols</li> <li>- Network layers</li> <li>- Packet switching</li> </ul> <p>System Security recap</p> <ul style="list-style-type: none"> <li>- Forms of attack</li> <li>- Threats posed to networks</li> <li>- Identifying and preventing vulnerabilities</li> </ul> <p><b>Theory assessment:</b> Network questions from OCR GCSE Computer Science Unit 1.4 and 1.5 and a case study from unit 1.8</p>	<p><b>Topic:</b> COMP 3Programming Project</p> <p><b>Fertile Question:</b> N/A</p> <p><b>25-30 hrs</b></p> <p><b>Deadline: Fri 4<sup>th</sup> May 2018</b></p> <p><b>Content:</b></p> <p>Pupils will prepare for and complete the controlled assessment element of the specification. This includes:</p> <ul style="list-style-type: none"> <li>- Programming techniques</li> <li>- Design</li> <li>- Development</li> <li>- Testing Evaluation and Conclusion</li> </ul> <p><b>Practical assessment:</b> Internally assessed externally moderated by OCR</p>
	<p style="text-align: center; font-size: 24pt; font-weight: bold;">Term 4</p>	<p><b>Buffer Topic:</b> Intro to Programming Part II</p> <p><b>Fertile Question:</b> What types of problems are quicker to solve by writing a program and what types of problems are slower to solve?it</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>- Fruit machine</li> <li>- Sequence</li> <li>- Selection</li> <li>- Iteration</li> <li>- Modules</li> <li>- Data Structures (Lists and Dictionaries)</li> </ul>	<p><b>Topic:</b> Networks</p> <p><b>Fertile Question:</b> Will the Internet slow down as it grows bigger and gets older?</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>- LAN vs WAN</li> <li>- LAN Hardware</li> <li>- Factors affecting performance</li> <li>- Star and Mesh Topologies</li> <li>- Wifi: Frequency, Channels, Encryption</li> <li>- The Internet: DNS, Hosting, The Cloud</li> </ul>	<p><b>Topic:</b> Ethical, Legal, Cultural and Environmental Concerns in Computing</p> <p><b>Fertile Question:</b> Have computers made the world better or worse?</p> <p><b>Content:</b></p> <p>Case studies / Court room scenarios:</p> <ul style="list-style-type: none"> <li>- iPhone vs FBI (Privacy)</li> <li>- Intel (Green) vs Google (Server farms)</li> <li>- Wikileaks</li> <li>- ISIS Missile Image</li> <li>- Cloud Computing</li> <li>- Apple vs Microsoft and the Xerox Debate</li> <li>- Samsung vs Apple</li> <li>- Technology Addiction and Childhood development</li> <li>- Landfill and Waste</li> <li>- Job creation vs Automation</li> <li>- Users with specific needs</li> <li>- Sampling in music</li> <li>-Facebook and how it uses your data</li> </ul> <p>-Comparing different technology in context</p> <p>-Stakeholders (direct and indirect) and how they are affected</p> <p>-Analysis of solutions and its effects</p>	<p><b>Topic:</b> Systems Software and Ethical, Legal, Cultural and Environmental Concerns</p> <p><b>Fertile Question:</b> Which software is most important at an intelligence agency such as MI5?</p> <p><b>Content:</b></p> <p>Systems Software</p> <ul style="list-style-type: none"> <li>- Purpose and functionality of systems software</li> <li>- Operating Systems</li> <li>- Utility System Software</li> <li>- Open Source vs Proprietary</li> </ul> <p>Legislation (Courtroom scenarios)</p> <ul style="list-style-type: none"> <li>- Data protection Act</li> <li>- Computer Misuse Act</li> <li>- Copyright, Design and Patents Act</li> <li>- Creative Commons Licensing</li> <li>- Freedom of Information Act</li> </ul> <p>-Comparing different technology in context</p> <p>-Stakeholders (direct and indirect) and how they are affected</p> <p>-Analysis of solutions and its effects</p>

	Practical assessment: Creating a quiz	Theory assessment: Network questions from OCR GCSE Computer Science Unit 1.4 and 1.5	Theory assessment: Questions from OCR GCSE Computer Science Unit 1.8	Theory assessment: Software questions from OCR GCSE Computer Science Unit 1.7 and a case study from unit 1.8	Practical assessment: Internally assessed externally moderated by OCR
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<b>Term 5</b>	<p><b>Topic:</b> Memory/Data representation</p> <p><b>Fertile Question:</b> How can computers store and process everything in 1's and 0's</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>- Binary representation of number</li> <li>- Binary representation of characters</li> <li>- Binary representation of images</li> <li>- Units</li> <li>- Hexadecimal</li> </ul> <p><b>Theory assessment:</b> Mock exam on Computer Systems</p>	<p><b>Topic:</b> Building a webpage</p> <p><b>Fertile Question:</b> Will the Internet slow down as it grows bigger and gets older?</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>- My favourite book/film webpage</li> <li>- HTML Tags</li> <li>- Images</li> <li>- Embedding content</li> <li>- CSS</li> </ul> <p><b>Practical assessment:</b> Creating a website about a prominent computer scientist</p>	<p><b>Topic:</b> Graphics / Multimedia Algorithms-Searching and Sorting</p> <p><b>Fertile Question:</b> How do media companies use Computers to construct their products?</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>- Logo Branding</li> <li>- Photo editing</li> <li>- Magazine Graphic Design (Front cover, Advert and DPS)</li> </ul> <p><b>Practical assessment:</b> Create a school magazine cover</p>	<p><b>Topic:</b> SQL</p> <p><b>Fertile Question:</b> How can we query a large data set using a programming language?</p> <p><b>Content:</b></p> <ul style="list-style-type: none"> <li>- Creating a table</li> <li>- Querying a table</li> <li>- Advanced queries using logical operators</li> </ul> <p><b>Practical and Theory assessment:</b> Playlist Creator from <a href="https://www.khanacademy.org/computing/computer-programming/sql/">https://www.khanacademy.org/computing/computer-programming/sql/</a> and Programming technique questions from OCR GCSE Computer Science 2.2, 1.6 (SQL injection) and a case study from 1.8</p>	<p><b>Topic:</b> Data Representation, System Security and Theory Revision</p> <p><b>Fertile Question:</b> Is there anything we cannot represent using 0's and 1's?</p> <p><b>Content:</b></p> <p>Data Representation</p> <ul style="list-style-type: none"> <li>- Recap: Units, Numbers</li> <li>- Character</li> <li>- Images</li> <li>- Sound</li> <li>- Compression</li> </ul> <p>System security</p> <ul style="list-style-type: none"> <li>- Forms of attack</li> <li>- Threats posed to networks</li> <li>- Identifying and preventing vulnerability</li> </ul> <p>Pupils will revise topics in preparation for their examinations. This includes:</p> <ul style="list-style-type: none"> <li>- re-teach of specific areas</li> <li>- practice of examination technique</li> <li>- past-paper analysis</li> </ul> <p><b>Theory assessment:</b> Walking Talking Mock <b>Fri 11<sup>th</sup> May 2018</b></p>
	<b>Term 6</b>	<p><b>Topic:</b> Theory Revision</p> <p><b>Fertile Question:</b> How does theoretical knowledge help us become better Computer Scientists?</p> <p><b>Content:</b></p> <p>Pupils will revise topics in preparation for their examinations. This includes:</p> <ul style="list-style-type: none"> <li>- re-teach of specific areas</li> <li>- practice of examination technique</li> <li>- past-paper analysis</li> </ul> <p><b>Theory assessment:</b> Computer Systems, Data Representation, Programming</p>	<p><b>Topic:</b> Theory Revision</p> <p><b>Fertile Question:</b> How does theoretical knowledge help us become better Computer Scientists?</p> <p><b>Content:</b></p> <p>Pupils will revise topics in preparation for their examinations. This includes:</p> <ul style="list-style-type: none"> <li>- re-teach of specific areas</li> <li>- practice of examination technique</li> <li>- past-paper analysis</li> </ul> <p>Topics:</p> <ul style="list-style-type: none"> <li>- Flowchart algorithms</li> <li>- Input/Output/Storage/SEND</li> <li>- Adding Binary/Ascii</li> <li>- CPU / Networks / Logic Gates</li> </ul> <p><b>Theory assessment:</b> Computer Systems, Data representation, Logic gates, Networks Programming</p>	<p><b>Topic:</b> Theory Revision</p> <p><b>Fertile Question:</b> How does theoretical knowledge help us become better Computer Scientists?</p> <p><b>Content:</b></p> <p>Pupils will revise topics in preparation for their examinations. This includes:</p> <ul style="list-style-type: none"> <li>- re-teach of specific areas</li> <li>- practice of examination technique</li> <li>- past-paper analysis</li> </ul> <p><b>Theory assessment:</b> Computer Systems, Data representation, Logic gates, Networks Programming, Cyber Security, Spreadsheets, Ethical, Legal, Cultural and Environmental Concerns</p>	<p><b>Topic:</b> Theory Revision</p> <p><b>Fertile Question:</b> How does theoretical knowledge help us become better Computer Scientists?</p> <p><b>Content:</b></p> <p>Pupils will revise topics in preparation for their examinations. This includes:</p> <ul style="list-style-type: none"> <li>- re-teach of specific areas</li> <li>- practice of examination technique</li> <li>- past-paper analysis</li> </ul> <p><b>Theory assessment:</b> Theory questions from questions from OCR GCSE Computer Science Units 1, 2.1, 2.2, 2.4, 2.6</p>