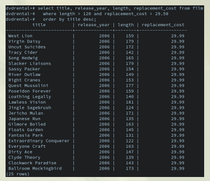
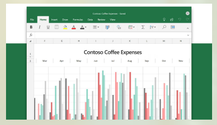
← Key Stage 2	7			8				9	Key Stage 4 →
	Autumn	Spring	Summer	Autumn	Spring	Summer	Autumn	Spring	Summer
Topics of Study	**Using Computers Safely Effectively Responsibly**	**Practical Office Skills**	**Programming**	**Computer Crime and Cyber Security**	**Spreadsheet modelling**	**Graphics or Games programming**	**Python Intro + Website Design**	**Understanding Computers + IT Creative Pathway**	**Animated / Graphics + Employability Skills**
Core Knowledge	**U.C.S.E.R** You will complete a course that introduces you to the concepts of using computers safely in both a work and social environment. You will gain an understanding of how the computers are both a tool and a hazard as well as how to avoid errors in judgement. 	**Practical Office Skills** You will be undertake learning of programs used in an office – word processing, spreadsheets, presentations and graphics software. You will gain an understanding of how these can be used in combination to produce a set of products 	**Small Basic** You will be introduced to programming concepts that set up the fundamentals of computing programming in any coding language. An understanding of this language will allow you to progress onto more heavily used languages and constructs in the software industry. 	**Cyber crime** You will learn how to identify and avoid the pitfalls associated with a computerized society. Understanding how and why criminals try to find your details and what measures can be taken will set you up for both work and social use of IT without fear. 	**Spreadsheet Modelling** You will learn the basic functions of a spreadsheet and progress onto making your own spreadsheet to solve your own problems. An understanding of spreadsheets and how they are used to model real situations and predict outcomes is useful in many situations in life. **Games Programming** You will learn to use the KODU software to design and create games. You will continue the development of computational thinking that you started in your work with small basic in Year 7. 	**Graphics** You will learn the differences between vector and bitmap graphics, and be able to use them both to convey meaning in your projects. You will understand the key differences between them as you produce a range of graphical products to meet an aim and audience.	**Python Programming** You will learn programming concepts dedicated to text input/output and data manipulation as well as learning the logical process that run most computer programs. An understanding of these processes will allow you to understand other subjects more easily and to design your own programs using components learned and re-used. 	**Understanding Computers** This sequence provides a brief look at aspects of the computer to prepare those students considering a Computer science route. ❑ How a computer thinks ❑ How it works with numbers ❑ How it stores data ❑ What is happening with technology today. **IT Creative Pathway** In Digital Animation you will learn: ❑ The basics of digital animation. ❑ The concept of frame by frame, onion skinning and tweening, to produce a digital animation.	**Employability skills** You will learn how to use programs to enable you to gain access to the world of work and to exemplify your digital literacy ready for impressing an employer. Showcasing the skills you have amassed over three years of IT and Computer Science education ready for ribbons on your Record of Achievement. 
Key Learning Outcomes	❑ Understand filing system and drives ❑ Understand the risks and opportunities associated with computers	❑ Understand different audiences and purposes ❑ Present work for a given audience and purpose ❑ Utilise standard programs to achieve high quality outcomes ❑ Integrate from various programs for more efficiency	❑ Create small programs ❑ Break processes down into smaller re-usable chunks	❑ Be able to explain the impact and solutions to a range of cyber crime related topics. ❑ Explain the risks associated with social media	❑ Use spreadsheets to find solutions ❑ Create spreadsheet solutions to real life situations	❑ Use image editing software and apply design rules ❑ Create interactive games using 3d graphics using a range of programming constructs.	❑ Create simple, logical programs ❑ Create programs to solve real life problems ❑ Understand logical constructs within programs ❑ Use programming techniques to simplify routines	❑ Be able to explain how computers affect some aspects of society ❑ Be able to manipulate binary mathmatically. ❑ Be able to calculate file sizes of image and sound files. ❑ Be able to use digital animation software. ❑ Use tweening, onion skinning, squash and splat to create a digital animation.	❑ Create a portfolio of skills to show employers ❑ Create CV and Business documents
	➢	➢	➢	PROGRESSION			➢	➢	➢
Opportunities & Adaptations	**Practical Application of Skills** STEM students are extended in their use of each of these skill sets with students expected to give actual presentations to the class and be able to integrate several programs to match an outcome. **Digital Literacy RIBBONS** The inclusion of activities that would deepen the knowledge and skill sets of pupils leading to the creation of evidence to support the Employability ribbon. The evidence will match against a set of Bronze, Silver and Gold criteria. Can be delivered across all years of this Key Stage				**Interactive Products / Fiction** You will learn to use a range of software solutions to plan, create and test an interactive product design to meet an aim and an audience. This could be improving the skill of interactivity and flow within a presentation or using Twine to create interactive fiction.		**IT Creative Pathway** You will learn a range of skills and software solutions to support the skill set required in year 10 for the IT Creative pathway. **Web Development** You will learn to create websites and the elements that are used to make interactive multimedia sites such as graphics and JavaScript. Understanding of the underlying elements of a website will give you an ability to create your own website. It also uses the idea of *research-plan- do- review* for products gaining this skill will help in topics of study in the IT Creative pathway **Animation** Studying animation will prepare students for the *plan - do -review* aspect of creation using ICT. The concept of *research-plan - do- review* is used in many parts of the IT Creative pathway		
Assessment	Worksheets by lesson Homework Assessments by lesson Written Unit Assessments by unit	Teacher designed	Worksheets by lesson Homework Assessments by lesson Written Unit Assessments by unit	Worksheets by lesson Homework Assessments by lesson Written Unit Assessments by unit	Worksheets by lesson Homework Assessments by lesson Written Unit Assessments by unit	Teacher designed	Worksheets by lesson Homework Assessments by lesson Written Unit Assessments by unit	Worksheets by lesson Homework Assessments by lesson Written Unit Assessments by unit	Teacher designed Using the digital literacy tracker is suggested.

Where next? →

GCSE COMPUTING SCIENCE
- Externally examined
- 2 Papers 50% / 50%
- No assessed Coursework components

Learning Areas
- Programming
- Problem Solving
- Computer Data
- Hardware and Software
- Communication
- Wider Issues

IT CREATIVE PATHWAY

OCR Cambridge National L1/2 in Creative iMedia.
RO81 Pre Production Skills (Exam - mandatory) 25%
RO82 Digital graphics (coursework - mandatory) 25%
RO85 Digital Animation (coursework) 25%
RO86 Multipage Website (coursework) 25%

MEDIA PATHWAY

OCR Cambridge National L1/2 in Creative iMedia.
RO81 Pre Production Skills (Exam - mandatory) 25%
RO82 Digital graphics (coursework - mandatory) 25%
RO84 Comic strip (coursework) 25%
RO86 Digital Video (coursework) 25%

KS3 Computing and IT

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THOMAS GAINSBOROUGH SCHOOL

← Key Stage 3

Year 10

Year 11

Key Stage 5 →

	Autumn	Spring	Summer	Autumn	Spring	Summer
Units **Topics of Study**	**AQA Unit 3 + 4:** **3: Data Representation** **4:Computer Sytems**	**AQA Unit 5:** **Fundamentals of Networks** **Mock Preparation**	**AQA Unit 6 + 7 + 8:** **6: Fundamentals of Cyber Security** **7: Relational Databases** **8: Ethical and Legal, Environmental**	**Unit 1 + Unit 2a:** **Fundamentals of Algorithms** **Programming pt1**	**Unit 2b + Preparation:** **Programming Pt2** **Revision Sessions Pt1**	**Revision Sessions Pt2** **(+Exam Preparation)** ***Exam dates: Before end of Summer 1**
Core Knowledge	Unit 3: ❑ Number bases ❑ Units of information - bit to TB ❑ Binary and Hexadecimal ❑ Character Encoding ❑ Representing Images ❑ Representing Sound ❑ Data Compression Unit 4: ❑ Hardware and Software ❑ Boolean Logic ❑ Software Classification ❑ Systems Architecture	**Unit 5:** ❑ What is a Network ❑ Wired vs Wireless ❑ Network Topologies ❑ Network Protocols ❑ Network Security ❑ TCP/IP Layer model (4) ❑ Internet Addressing methods **Mock Preparation:** A minimal part of the term. Focussing on the units that have been delivered, and exam style questions.	Unit 6: ❑ Cyber Security Threats ❑ Social Engineering ❑ Malicious Code ❑ Methods to detect and prevent Unit 7: ❑ Relational Databases ❑ Structured Query Language Unit 8: ❑ Ethical Implication ❑ Environmental Implications ❑ Legal Implications ❑ Digital Tech in wider Society ❑ Issues of Privacy	Unit 1: ❑ Representing Algorithms ❑ Efficiency of Algorithms ❑ Searching Algorithms ❑ Sorting Algorithms Unit 2a: ❑ Python IDE ❑ Data Types ❑ Sequence, Iteration and Selection ❑ Arithmetic Operations ❑ Relational Operations ❑ Boolean Operations ❑ Programming Concepts ❑ Input and Output ❑ String Handling ❑ Random Numbers	Unit 2b: ❑ Subroutines ❑ Data Structures ❑ File Handling ❑ Classification of Languages (link to U4) ❑ Determining the Purpose (link to U1) ❑ Structured Programming ❑ Validation and Authentication ❑ Robust Programming ❑ Errors and Testing ❑ Recap and Revision: Each unit of study will be revisited to look at key concepts and key misunderstandings.	**Revision and Exam Practice:** This term is a short term. (Expect the date of the public exam to be at the start of May) This gives about 9 lessons of study. ❑ 4 Lessons will have a Paper One Focus looking at exam technique, and mark scheme reviews, with subsequent DIRT tasks. ❑ 4 lesson will have a Paper Two Focus looking at exam technique, and mark scheme reviews with subsequent DIRT tasks. ❑ Additional lesson will be used for exam practice / Q and A sessions.
Key Learning Outcomes	Can understand /state /explain /justify: **Unit 3:** ❑ How to: Δ perform binary addition Δ perform binary shifts Δ convert to & from number bases Δ calculate files size: *for image and sound files. ❑ File size for storage and transmission ❑ Why size (and quality) are a factor of Sample rate Hz and Bit depth ❑ How to encode and decode using RLE ❑ Character encoding methods ❑ Huffman Encoding ❑ Image Encoding (single bit) ❑ Able to convert to/from Boolean to Logic Gates drawing **Unit 4**: ❑ The workings of CPU ❑ Fetch Decode Execute cycle ❑ ROM, RAM, CACHE, CLOCK SPEED, MAIN MEMORY VS SECONDARY STORAGE ❑ Secondary storage types ❑ Cloud Storage. ❑ Embedded systems ❑ Explain Von Neumann architecture	Can understand /state /explain /justify: **Unit 5** ❑ Pros and Cons of network topologies ❑ Benefits and risks of wired and wireless ❑ Star and Bus networks strengths and weaknesses. ❑ The concept of network protocol ❑ The purpose and use of : ethernet, wifi, TCP, UDP, HTTP, HTTPS, FTP, SMTP, IMAP, POP ❑ The need for network security, with accurate use of terminology: authentication, firewall, encryption, mac filtering, ❑ 4 layer TCP/IP layer model and the alternative names often used. ❑ Where the various protocols operate within the 4 layer model. **MOCK PREPARATION:** In the latter part of this term the lessons will be used to recap the units that have already been studied, with a range of internal and external (homework) tasks that will prepare the students for the Mock exam that traditionally takes place in March	Can understand/ state/explain/justify: **Unit 6:** ❑ a range of cyber security threats ❑ Concept of penetration testing ❑ Social engineering and ways of protecting against. ❑ what malware is and how it can be protected against. ❑ a range of security measures **Unit 7:** ❑ …how to create a flat file database ❑ …how to create a standard query ❑ …how to use SQL to retrieve data ❑ …how to use SQL to insert data. **Unit 8:** ❑ The current ethical, legal and environmental impacts. ❑ Risks of digital technology on society. ❑ Data privacy issues.	Can understand/ state/explain/justify: **Unit 1**: ❑ The terms Algorithm, Decomposition, Abstraction. ❑ Flowcharts and Pseudo as planning tools ❑ …and use a systematic approach to problem solving (computational thinking) ❑ Compare the efficiency of algorithms. ❑ The mechanics of linear + binary search. ❑ The mechanics of bubble + merge sorts. **Unit 2a**: ❑ The concept of data type. ❑ Numbering methodology (python) ❑ …and use selection, iteration, sequence to construct programmatic solutions. ❑ …and use nested iteration. ❑ The use of meaningful identifiers ❑ The use of code comments ❑ Use of: +,=,-,/, < , > , <= , >= != , == , % , // ❑ Use of MOD and DIV (Pseudo)	Can understand/ state/explain/justify: **Unit 2a**: ❑ Use of Boolean: NOT, OR, AND ❑ Data structures wider context. ❑ Data structures python: 1d & 2d Arrays , LISTS, TUPLES, DICTIONARY (TBC) ❑ Read from and Write to external files. ❑ A range of string handling functions. ❑ Use of: Python Import statement: RANDOM, TIME, MATH ❑ Concept and use of global and local variables, (Public and private) ❑ Procedures and Functions. ❑ Passing Parameters in and out. ❑ …and use of a structured approach. ❑ ..able to write simple data validation and authentication routines. ❑ … testing routines for normal, boundary, and erroneous data forms. ❑ Compiler vs Interpreter ❑ High level vs Low Level. **Recap and Revision:** ❑ Each student will construct their own additional revision resource for each unit of study.	Can understand/ state/explain/justify: Pupils will have explored: ❑ …and handled a varying range of differing styles of exam question ❑ How a QWC question should be answered ❑ How to use PEE (or similar) when structuring an answer ❑ How to plan an answer ❑ Unit 1 and Unit 2 in preparation for Paper 1 ❑ Unit 3-7 in preparation for Paper 2 ❑ …and used range of past papers in preparation ❑ The use of external forms of revision such as Seneca, and GCSEpod ❑ Extending answers using DIRT activities 
	➤	➤	➤	➤	➤	➤
Opportunities & Adaptations				The order of elements within 2a and 2b is often changed to support class dynamic.	Setting an Easter Holiday Task to support the fast approaching public exam. Normally start of May* TBC	Seneca, gcse pod, exampro, past paper from other specs…catch up sessions during lunch TBC
Vocabulary	BINARY, HEX, HEXADECIMAL, NIBBLE, BYTE, TERRA, GIGA, HZ, SAMPLE, RESOLUTION, BITMAP, PIXEL, LOGIC GATE, BOOLEAN, TRUTH TABLE, HUFFMAN	PAN, LAN, WAN, TOPOLOGY, STAR, RING, BUS, WIRED, WIRELESS, ETHERNET, PROTOCOL, BANDWIDTH, WIFI, UDP, HTTP, FTP, HTTPS, SMPT, POP, IMAP, ICP , PACKET SWITCHING, NODE, PACKET, HEADER, PARITY, ERROR CHECKING, ENCRYPTION, MAC FILTERING, AUTHENTICATION.	White hat, Black Hat, penetration testing, social engineering, malware, virus, hacker, key logger, biometric, Attribute, Database, Entity, Field, Flat file, Foreign Key, Primary Key, Redundancy, Record, Relational Database, Table	**Unit 1:** Algorithm, decomposition, abstractions, input, process, output, trace table, merge, bubble, insertion?(TBC), binary search, linear search **Unit 2:** Variable declaration, constant declaration, assignment, selection, sequence, iteration, count controlled loop, condition controlled loop, nested structure, relational, arithmetic, Boolean, dimensional array, records, string functions, subroutine, random number generation (rng), subroutine, Argument, parameter, local, global, import, read write,		QWC, P.E.E,
Assessment	Worksheets by lesson Homework Assessments by lesson Written Unit Assessments by unit	Worksheets by lesson Homework Assessments by lesson Written Unit Assessments by unit Mock Exam	Worksheets by lesson Homework Assessments by lesson Written Unit Assessments by unit	Worksheets by lesson Homework Assessments by lesson Written Unit Assessments by unit Practical Assessment Python	Worksheets by lesson Homework Assessments by lesson Written Unit Assessments by unit	Public Exam x2 Results in August

Where next? →

BTEC Level 3
Information Technology

Unit 1 Information Technology Systems

Learning Areas:

- Digital Devices in IT systems
- Transmitting Data
- Operating Online
- Protecting Data and Information
- Impact of IT systems
- Issues

Unit2 Systems to manage information

Learning Areas:

- Purpose and Structure of a relational database
- Methods and techniques to design
- Creating a relational database

Unit 3 Using Social Media in Business

Learning Areas:

- Explore the impact of Social Media
- Develop a Plan to use Social Media in business
- Implement the use of Social Media in a business.

Unit 6 Website development

Learning Areas:

- Principles of Website development
- Design a website to client requirements
- Develop website to meet requirements

GCSE Computer Science

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← Key Stage 4		Year 12			Year 13	University ^ Employment →
	Autumn	Spring	Summer	Autumn	Spring	Summer
Units Topics of Study	Unit 1 and Unit 6 Information Technology Systems Website Development	Unit 1 and Unit 6 and Exam continues... Jan Exam Unit 1 *first attempt*	Unit 1 and Unit 6 Finishing End of Unit 1 Teaching Deadline for Unit 6 Completion	Unit 2 and Unit 3 Systems to Manage Information Social Media in Business	Unit 2 and Unit 3 continues... Jan Exam Unit 1 (*first resit*) Unit 2 *first attempt*	Unit 2 and Unit 3 Finishing and Exams June Exams Unit 1 (*second resit*) Unit 2 (*first resit*) Deadline for Unit 3 completion
Core Knowledge First Unit	**Unit 1 Information Technology Systems** Learning Areas: ☐ Digital Devices in IT systems ☐ Transmitting Data ☐ Operating Online ☐ Protecting Data and Information ☐ Impact of IT systems ☐ Issues			**Unit2 Systems to manage information** Learning Areas: ☐ Purpose and Structure of a relational database ☐ Methods and techniques to design ☐ Creating a relational database		
Core Knowledge Second Unit	**Unit 6 Website development** Learning Areas: ☐ Principles of Website development ☐ Design a website to client requirements ☐ Develop website to meet requirements			**Unit 3 Using Social Media in Business** Learning Areas: ☐ Explore the impact of Social Media ☐ Develop a Plan to use Social Media in business ☐ Implement the use of Social Media in a business.		

Unit 1

Unit 1

Unit 2
Exam resit June

Where next? →

Using BTEC Information Technology Level 3 as a stepping stone to further education and training..

University Degree Courses

- Business Information Technology
- Business Computing and IT
- Computer Arts
- Computer Games Technology
- Computer Science
- Computing Forensics
- Creative Computing
- Digital Technology Solutions
- Computer Hardware and Software Engineering
- Digital Technology Innovation
- Computer and Cyber Forensics

Careers in Information Tech

- IT consultant
- Cloud Architect
- Computer Forensic Investigator
- Health IT Specialist
- Mobile Application Developer
- Web Developer
- Software Engineer
- Information Technology Vendor Manager
- Data Modeller
- Geospatial Professional
- Cyber Security Analyst
- Game Developer
- IT Trainer
- Information Systems Manager

BTEC Information Technology Level 3

Excellence; for each, for all

THOMAS GAINSBOROUGH SCHOOL

IT & Computing

IT & Computing is integral to our school curriculum to provide all young people with the computational thinking skills, wisdom and awareness to be safe, creative and adaptable in their use of technology within employment, social situations and in further study.

Heart

E-safety
Ethically aware
Persuasive presentation

Head

Computational thinking
Problem solving
Networks
Programming
Audience & purpose
Choice of tools

Hands

Skills
Flexibility & adaptability
Employability
Communication
Modelling

IT and Computer Science skills are essential to the modern working environment. Young people will also need to make choices around the use of technology as responsible citizens. At Thomas Gainsborough School our aim is to ensure that students leave understanding how to harness technology in exciting and innovative ways.