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10 ANNIVERSARY EDITION

Dear friends and colleagues

It's been 10 years!

We have all loved every minute of it too. Writing, editing, checking, designing and dreaming up newer and better resources to support our community of Computer Science, IT and iMedia teachers. I could not have imagined how well received our materials would have been in 2013, nor could I have imagined the impact that they have had on teachers and students. This year, we have revisited our original KS3 series and individually updated each unit to make them better than ever and ensure a solid foundation for KS4 learning.

We very much look forward to supporting you and your students for another decade. Thank you very much for all your support and let's see what the future brings...

Rob

Rob Heathcote
Director

Company formed
November 2013

Launched KS3 Teaching Units Computer Science
November 2013

Launched GCSE Teaching Units Computer Science
September 2014

Launched Print-On-Demand Textbooks
November 2014

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May 2015

Expanded premsies
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April 2019

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ClearRevise **Expansion of series**
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Coming soon...?
2023/2024

10th Anniversary KS3 series
September 2023

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GA Publishers' Awards 2023 Highly Commended

Company of the Year Finalist 2018 - 2021

KS3 10th Anniversary Edition

A series of award-winning editable resources to support new and non-specialist teachers which provide a consistency of excellence across a whole department.
Learning platform use included.

Many upgrade units available now. Further units will be released throughout 2023 / 2024

Unit upgrades from £20

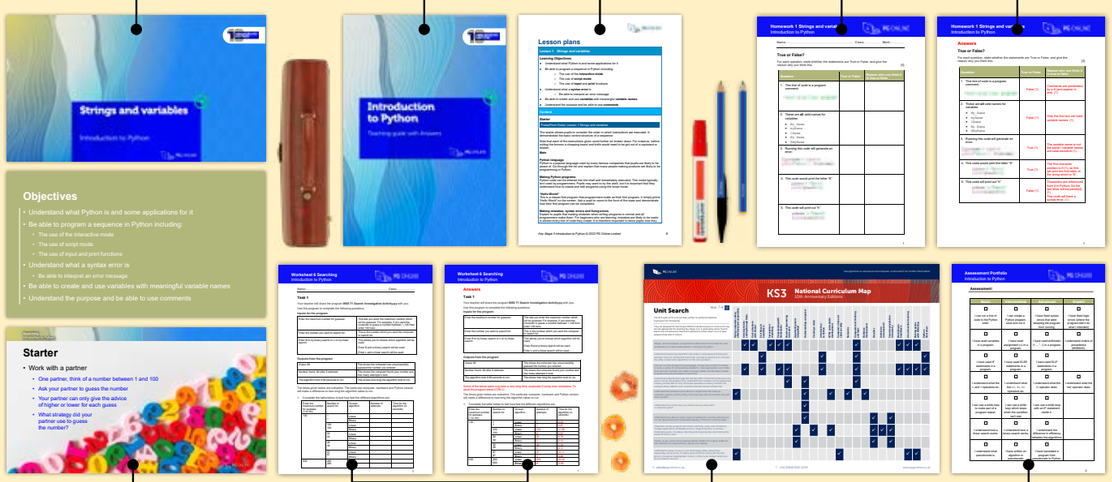
What's included in the new KS3 units?

Engaging and beautifully illustrated HD presentations to help structure a lesson around the specification objectives

Detailed lesson plans provide a step-by-step how-to of every lesson. Perfect for non-specialists

Editable resources encourage customisation and promote ownership, increasing attention

Weighted homework with mark allocations



Starters and plenaries with every lesson.

Practical worksheet activities encourage application of skills without the pressure of being marked

A specification map provides reassuring guidance as to how and where each point is covered

Each unit comes with a multiple-choice assessment which makes marking a breeze or a portfolio for pupils to show their achievements.

1. Revised content that fully meets the national curriculum requirements
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8. Worksheets with answers for every lesson
9. Starter activities and plenaries for every lesson
10. Activity preparation slides in all presentations

New! **Key Stage 3 Computer Science & IT**

10 ANNIVERSARY EDITION

A substantial upgrade to our original KS3 series. These units are proven to have a statistically significant impact on subsequent GCSE results.

The units are designed for teaching at KS3 but individual lessons in some units may also be appropriate for teaching Key Stages 2 or 4, particularly where Year 10 students may not previously have been exposed to certain topics.

Each unit contains a **FREE lesson** which can be downloaded from our website.

Get in touch to order your units

Making games with GDevelop

NEW

This unit gives students practical opportunities to design and program two games. Students begin by creating a firework game that makes use of particle emitters and events. They then spend four lessons developing a platform game that makes use of many key games programming concepts such as sprites, collision detection and variables for use in scoring. Key object oriented programming concepts (OOP), such as objects and instances, are introduced in a KS3 appropriate manner. Students will develop programming skills through the development and iterative testing of their games. The programming language makes use of a visual programming environment which is an excellent transition between block programming and text programming.

FREE LESSON
- Lesson 1: Properties and particle emitters
- Lesson 2: Characters and sprites
- Lesson 3: Collision detection
- Lesson 4: Falling and spawning
- Lesson 5: Rewards and hazards
- Lesson 6: Assessment

Introduction to Python

This is an introduction to Python, a powerful but easy-to-use high-level programming language. Although Python is an object-oriented language, at this level the object-oriented features of the language are barely in evidence and do not need to be discussed. The focus is on getting pupils to understand the process of developing programs, the importance of writing correct syntax, being able to formulate algorithms for simple programs and debugging their programs. Pupils will look at If statements and While loops whilst covering concepts such as validation and searching.

The pupils' final programs are put into a learning portfolio with evidence of correct running, for assessment purposes.

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FREE LESSON
- Lesson 1: Strings and variables
- Lesson 2: Numbers and arithmetic
- Lesson 3: Selection
- Lesson 4: Writing algorithms
- Lesson 5: While loops
- Lesson 6: Searching
- Lesson 7: Assessment

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2 – 5 units	–	10%
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Understanding computers

This is a theoretical unit covering the basic principles of computer architecture and use of binary. Pupils will revise some of the theory on input and output covered in previous learning and continue to look at the Input-Process-Output sequence and the Fetch-Decode-Execute cycle through practical activities. Pupils will then look at some simple binary-to-decimal conversion and vice versa, and learn how text characters are represented using the ASCII code. This is followed by some simple binary addition. Pupils will look in more depth at how storage devices store or represent data using binary patterns. A final lesson covers the history and development of communication and technology, and some of its applications.

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Lesson 1: Elements of a computer system
Lesson 2: The CPU
FREE LESSON Lesson 3: Understanding binary
Lesson 4: Binary addition
Lesson 5: Storage devices
Lesson 6: Convergence and new technologies

Networks

This is a theoretical unit covering the basic principles and architecture of local and wide area networks. Pupils will learn that the World Wide Web is part of the Internet, and that web addresses are constructed and stored as IP addresses using DNS. They will learn about data transmission and, through an understanding of different network topologies and network hardware, they will plan the structure of a local area network. Client-server and peer-to-peer networks and the concept of cloud computing are all described. Ways of keeping data secure and simple encryption techniques are also covered. In the final lesson, pupils will sit a multiple choice test which will form the unit assessment. This unit will form a very good introduction to the topic of networks at GCSE level.

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Lesson 1: The Internet
FREE LESSON Lesson 2: Connectivity
Lesson 3: Topology
Lesson 4: Client-server networks
Lesson 5: Encryption
Lesson 6: Assessment

AI and machine learning

This unit gives students a first insight into the fascinating world of Artificial Intelligence and Machine Learning. Pupils begin by considering where AI is used from simple problems such as solving a maze to those more advanced, such as self-driving cars. Students will then look at how machine learning and deep learning are used in image recognition. This is a fast moving area of development, so the Ethics of AI is considered. The following lessons give an opportunity to develop AI programs such as a simple image recognition system, a virtual assistant and a sentiment analysis system for film ratings.

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FREE LESSON Lesson 1: What is AI?
Lesson 2: Machine learning
Lesson 3: Ethics of AI
Lesson 4: Image recognition
Lesson 5: Turing tests and chatbots
Lesson 6: Rate my review

HTML and website development

In the first three lessons, pupils will learn the basics of HTML and CSS, and how to create a responsive design which adapts to any size of screen for viewing on, say, a mobile phone or a PC. They will learn how to create text styles and add content, including text and graphics, in a specified position on a page, as well as navigation links to other pages on their website and to external websites. The basics of good design are covered and, with the help of worksheets, pupils will develop their own templates in a text editor such as Notepad. They will then use HTML templates to create their websites, including a web form. Pupils can view the data collected into a simulated database from the web form. This also helps to stimulate discussion on the privacy of data.

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FREE LESSON Lesson 1: HTML
Lesson 2: CSS
Lesson 3: Design
Lesson 4: Development
Lesson 5: Creating a web form
Lesson 6: Assessment

Computational thinking and logic

This unit introduces students to the world of computational thinking and logic. With the help of many unplugged activities, students get to understand the power of problem solving and the different methods that Computer Scientists use to tackle problems.

This unit includes many novel activities to introduce key topics. For example, logical deductions and logical puzzles are used to show logical thinking, water pipes are used to introduce logic gates, network topology is used to show how mazes can be solved and phone messaging is used to demonstrate decomposition.

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FREE LESSON Lesson 1: Logical thinking
Lesson 2: Logic gates
Lesson 3: Algorithmic thinking 1
Lesson 4: Algorithmic thinking 2
Lesson 5: Abstraction
Lesson 6: Decomposition

Python: Next steps

This unit assumes that pupils already have some prior experience in Python or a similar language, and the first lesson has a series of tasks designed to revisit the basic skills already covered. Pupils then use For loops and compare their use with While loops, before moving on to arrays (lists), which are introduced as a new data structure and are used in conjunction with For loops. Procedures and functions with parameters are covered to help pupils understand the concept and benefits of modular programming. This unit is designed to take pupils right up to a point where a GCSE in Computing can pick up and should provide ample experience of programming in order to confirm any decision to pursue Computing as a GCSE option.

Upgrade version available NOW

Lesson 1: The basics
Lesson 2: Loops
FREE LESSON Lesson 3: Lists
Lesson 4: Procedures
Lesson 5: Functions
Lesson 6: Assessment

Many thanks for continuing to improve and expand your excellent resources. I can't begin to add up the time it has saved us.

Jules Hazzledine, Head of ICT,
William Farr School

App development in Appshed

This unit will enable pupils to create a complete app with full takeaway functionality on an iPhone, Android, Windows or Blackberry smartphone as well as a desktop web browser in class. Pupils will plan and implement their own projects using skills from a teacher demonstration app which creates a guide to the Periodic table including image galleries, video, interactive maps, and web links. Pupils will also be able to program extensions to their own apps using the built-in language Blockly. The unit will be assessed using an assessment portfolio and the completed apps can also be made available for parents and teachers to view online.

Upgrade version available NOW

FREE LESSON Lesson 1: Introduction to Apps
Lesson 2: Home screen and navigation
Lesson 3: Adding files, links and images
Lesson 4: Using map functions
Lesson 5: Programming with Blockly
Lesson 6: Publishing your App

Computer crime and cyber security

This unit covers some of the legal safeguards regarding computer use, including overviews of the Computer Misuse Act, Data Protection Act and Copyright Law and their implications for computer use. Phishing scams and other email frauds, hacking, "data harvesting" and identity theft are discussed together with ways of protecting online identity and privacy. Health and Safety Law and environmental issues such as the safe disposal of old computers are also discussed. Safety is discussed outside the realm of e-safety which is covered in greater detail in the Using computers safely, effectively and responsibly unit. Assessment for this unit is by means of a multiple-choice test.

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Lesson 1: Email scams
FREE LESSON Lesson 2: Hacking
Lesson 3: Protecting personal data
Lesson 4: Copyright
Lesson 5: Health and Safety
Lesson 6: Assessment

Database development

This unit covers essential theory of databases in order to prepare pupils for a GCSE in either Computing or ICT. Supporting the basic theory are practical exercises covering the creation and use of a single-table database and/or a simple relational database involving two tables in a one-to-many relationship using MS Access.

The first lesson is designed to engage pupils in the concept of databases using a number of "Unsolved Crimes" and a database of suspects, from which pupils must use queries to find the culprit for each of the cases they have been allocated.

In subsequent lessons pupils will create a flat-file or two-table relational database of their own, using suitable field types and adding in appropriate validations. They will create an input form, queries, a report and a front end menu for their application. Two populated databases have been included for demonstration of these skills by the teacher.

Lesson 1: Introduction to databases
Lesson 2: Creating a database table
FREE LESSON Lesson 3: Queries
Lesson 4: Input forms
Lesson 5: Creating a report
Lesson 6: Finishing and testing

Using computers safely, effectively and responsibly

This is a theoretical unit covering the necessary basic knowledge to use computers safely, effectively and responsibly. Pupils will begin by looking at file management and security. The unit then moves on to e-safety (cyber-bullying, phishing etc.), and online profiles to give pupils a better understanding and awareness of using social media. The functionality and operation of email and search engines and how to use them effectively are covered, and a final lesson includes a multiple-choice test on the contents of the unit and basic computer use. This might form part of a baseline assessment for new pupils if taught early in Year 7.

Lesson 1: File management
FREE LESSON Lesson 2 Social media
Lesson 3 Keeping data safe
Lesson 4 Using email
Lesson 5 Searching the web
Lesson 6 Assessment

Other KS3 units include:

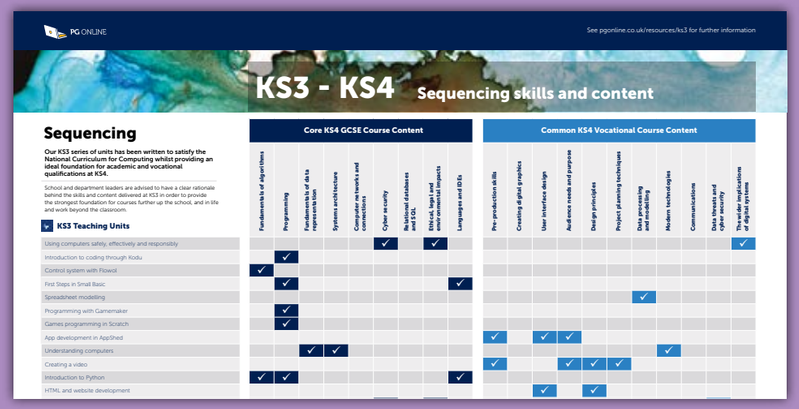
- Animation in Animate CC
- First Steps in Small Basic
- Modelling in Small Basic
- Control systems with Flowol
- Programming with GameMaker
- Introduction to coding through Kodu
- Sound manipulation in Audacity
- Creating a video
- Graphics
- Games programming in Scratch
- Spreadsheet modelling

See our website for more details.

Provide the perfect foundation for KS4

Download our free sequencing map

DOWNLOAD



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"I really do think your resources are excellent. I very rarely use other people's resources, but the quality has been so excellent, even I cannot say no!"
Matt Lowe, Head of Computing, Barton Court Grammar

"Overall, I can only sing praises for PG Online's resources."
Jeffrey Amponsah, Head of Computer Science, The Ravensbourne School.

Cumulative discounts:

2 – 5 units	–	10%
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KS3 National Curriculum Map

10th Anniversary Editions

Unit Search

Year 7-9

The KS3 series of 23 units has been written to satisfy the national curriculum for Computing.

They are designed for teaching at KS3 but individual lessons in some units may also be appropriate for teaching Key Stages 2 or 4, particularly where Year 10 pupils may not previously have been exposed to certain topics such as basic programming skills in Python.

	Using computers safely, effectively and responsibly	Introduction to coding through Kodu	Control system with Flowol	First Steps in Small Basic	Spreadsheet modelling	Programming with Gamemaker	Games programming in Scratch	App development in AppShed	Understanding computers	Creating a video	Introduction to Python	HTML and website development	Computer crime and cyber security	Networks	Computational thinking and logic	Database development	Graphics	Animation in Animate CC	Sound manipulation in Audacity	Modelling in Small Basic	AI and machine learning	Making games with GDevelop	Python: Next steps
Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems		✓	✓		✓	✓	✓								✓					✓	✓	✓	
Understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem				✓							✓				✓								✓
Use two or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions		✓		✓		✓	✓				✓				✓					✓	✓	✓	✓
Understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]							✓		✓						✓								
Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems	✓								✓			✓		✓		✓							
Understand how instructions are stored and executed within a computer system									✓														
Understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits									✓								✓		✓				
Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users								✓		✓		✓					✓	✓	✓				
Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability								✓									✓		✓				
Understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct and know how to report concerns	✓												✓								✓	✓	

Programming skills series
New! SQL teaching unit

This unit provides five engaging databases which are interrogated by students using practical SQL statements.

The unit covers all the SQL topics required by the major GCSE exam boards. It also provides a solid foundation for those studying A-level. Students will gain practical and engaging real-world experience in writing SQL.

Both skills units give additional practice covering key skills required for GCSE boards and much of the content required for A Level.

Practical skills in SQL

This unit gives students extensive practical opportunities to use SQL with engaging databases and real-world data. Students begin by learning the basics of SQL including SELECT and WHERE. They then build on WHERE clauses and add in the ability to put data into order with ORDER BY. The aggregate functions SUM and COUNT are covered along with the use of two tables. Adding and editing data using INSERT and UPDATE statements and removing data with the DELETE statement are covered towards the end of the unit. Finally students will get the opportunity to carry out practical SQL injection.

The unit covers everything required for SQL at GCSE level with OCR, AQA and Cambridge iGCSE exam boards. It is also a thorough foundation to most of the SQL topics required in AQA and OCR A-level.

NEW

FREE LESSON Topic 1: Introduction to SQL
Topic 2: WHERE and ORDER BY
Topic 3: LIKE, SUM and COUNT
Topic 4: Using two tables
Topic 5: INSERT and UPDATE
Topic 6: DELETE and SQL injection
Unit assessment

Practical programming skills in Python

This unit contains ten topics each guiding GCSE students through the essential programming skills required to develop their own practical projects with success and competence. The unit assumes little prior experience of Python and gradually builds up proficiency in ten key skill areas including file handling, validation and working with lists. The practical application of each of the skill areas covered will also assist students with their understanding of the theoretical examination questions required of all the (9-1) GCSE and IGCSE specifications.

The unit concludes with an appendix of exemplar solutions to five projects which each demonstrate different applications of the major skills commonly required at this level.

Lesson 1: Fundamentals
Lesson 2: Selection and iteration
Lesson 3: Functions and procedures
Lesson 4: Regular expressions
Lesson 5: Using lists FREE LESSON
Lesson 6: Sorting lists
Lesson 7: Reading files
Lesson 8: Writing files
Lesson 9: 2D lists
Lesson 10: Programming techniques
Appendix: Practical problems

Get in touch to order your units

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"I really like your resources that are engaging and challenging for students at every level. I highly recommend you to any teachers."

Songul Adams, Head of Computing,
Everest Community Academy

Best Seller

AQA GCSE 8525

To help teachers with the delivery of the AQA GCSE (9-1) 8525 qualification, we are pleased to offer a range of eight teaching units covering the theoretical elements (including programming theory) required for the written examination papers. The unit on Impacts of digital technology is **free**.

Each unit includes imaginative exercises and homework ideas, along with beautifully presented PowerPoint slides to accompany detailed lesson plans. The homework questions in each unit are written in an examination style to best prepare students for an end-of-unit assessment test. Full answers are included.

Board swap discounts available

Unit 8: Impacts of digital technology – FREE

This free unit begins by looking at the ethical impacts of technology on wider society including those of cyber security, social media and computer-based implants. Students are encouraged to examine a range of case studies to understand the impact on themselves and others. The unit continues to look at the impact on the environment. This introduces the product lifecycle and the effect of our demand for rare materials used in mobile and wearable technologies. Lastly, the unit focuses on current legislation and privacy concerns through the use of contextual examples.

Lesson 1: Ethical impacts of technology on society
Lesson 2: Environmental impacts of technology on society
Lesson 3: Legislation and privacy
Lesson 4: Assessment

This unit is free. Order online.

Unit 1: Fundamentals of algorithms

This unit focuses on Section 3.1 Fundamentals of algorithms of the AQA 8525 specification, and begins by covering decomposition and abstraction. Further lessons in the unit cover algorithms, flowcharts and pseudocode, before looking at specific algorithms for sorting and searching, including the bubble and merge sorts. A final lesson covers the efficiency of algorithms, comparing the processing time and results of different algorithms on the same data sets.

Lesson 1: Algorithms, decomposition and abstraction
Lesson 2: Developing algorithms using flowcharts
FREE LESSON Lesson 3: Developing algorithms using pseudocode
Lesson 4: Searching algorithms
Lesson 5: Sorting algorithms
Lesson 6: Assessment

Download a **FREE** topic with every unit at
www.pgonline.co.uk

"PG Online [materials have] become a vital teaching aid for us. The language used is well thought out and very little adapting is needed prior to delivery!"

Shilain Keshani, Head of Enterprise,
Drayton Manor School

Unit 2A: Programming

The unit covers the AQA GCSE (9-1) Computer Science specification 8525, Sections 3.2.1 to 3.2.9. The first lesson in the unit covers data types and arithmetic operations. Sequence, selection and iteration are covered in the next two lessons, followed by a lesson on arrays and records, with a final lesson on reading from and writing to a text file.

FREE LESSON Lesson 1: Data types and operators

Unit 2B: Programming

This is the second of two units which together cover all of the material in Section 3.2 Programming of the AQA syllabus. The unit specifically covers the theoretical aspects of programming. Ample practice in understanding and designing algorithms written in pseudocode or using flowcharts, debugging and testing is given in worksheets and homework.

FREE LESSON Lesson 1: Procedures and functions

Unit 3: Fundamentals of data representation

This is a theoretical unit covering the latest AQA Computer Science specification 8525. The conversion of integers from denary to binary is covered in the first lesson, together with the binary addition of three numbers and binary shifts. In subsequent lessons, the use of hexadecimal numbers and character encoding is described with practical programming exercises to reinforce understanding. Representation of images and sound are covered in two separate lessons with a final lesson covering lossy compression techniques used for images, sound and video, and lossless techniques such as RLE and Huffman encoding. In the final lesson students sit an assessment test comprising questions similar to those found on the GCSE exam paper.

Lesson 1: Units and binary numbers
Lesson 2: Binary arithmetic and hexadecimal
Lesson 3: ASCII and Unicode
FREE LESSON Lesson 4: Representing images
Lesson 5: Representing sound
Lesson 6: Data compression
Lesson 7: Assessment

Unit 4: Computer systems

The unit is subdivided into seven learning hours spread across seven lessons, plus a test, in order to fit with most school timetables. It is a theoretical unit covering Section 3.4 of the latest AQA GCSE Computer Science specification.

It builds on the fundamentals covered in the Key Stage 3 NC and our unit Understanding Computers and then extends this knowledge to a level sufficient for examination purposes. Students begin by looking at Boolean logic, moving on to software classification including the function of the Operating System. Lessons continue to cover systems architecture and factors affecting performance. The many forms of memory available in modern computers including RAM, ROM and cache are also covered along with secondary storage devices and their uses.

Lesson 1: Boolean logic
Lesson 2: Application and system software
Lesson 3: Classification of programming languages and translators
Lesson 4: Systems architecture
Lesson 5: The CPU and Fetch-Execute cycle
Lesson 6: Memory
FREE LESSON Lesson 7: Secondary storage
Lesson 8: Assessment

Unit 5: Fundamentals of computer networks

This unit contains five engaging lessons covering Section 3.5 of the latest AQA 8525 specification. The lessons begin by comparing wired and wireless networks, including PANs, LANs, WANs and network topologies. Subsequent lessons cover a wide range of common networking and Internet protocols with reference to the TCP/IP protocol stack and the concept of layers. One topic also looks at network security including encryption and MAC address filtering. Practical activities to develop and consolidate understand of each concept are provided in imaginative worksheets and examination-style homework with every lesson.

Lesson 1: Wired and wireless networks
FREE LESSON Lesson 2: Network topologies and transmission
Lesson 3: Network security
Lesson 4: Protocols and layers
Lesson 5: Assessment

Unit 6: Cyber security

This short unit covers everything in Section 3.6 of the AQA 8525 specification. It begins by examining the threats to, and vulnerabilities of networks, computers and programs including the concept of social engineering. Various forms of malicious code and its effects are covered. The unit concludes with a lesson on the detection and prevention of cyber security threats.

FREE LESSON Lesson 1: Cyber security threats
Lesson 2: Social engineering
Lesson 3: Malicious code
Lesson 4: Detecting and preventing cyber security threats
Lesson 5: Assessment

Unit 7: Relational databases and SQL

This unit covers everything in Section 3.7 of the latest AQA 8525 specification. It begins by covering the concept of a database before extending this into relational databases and associated terminology. Inconsistency and redundancy are covered before looking at Structure Query Language (SQL). SQL is used to write and interpret simple queries and to insert, update or delete data from a database table.

FREE LESSON Lesson 1: The concept of a database
Lesson 2: The concept of a relational database
Lesson 3: Structured query language (SQL)
Lesson 4: Assessment

"I purchased the PG Online units at the beginning of this academic year and they have been fantastic. The pupils like the activities and I found them brilliant to support my knowledge and understanding of what the exam board expected.

Dr Elizabeth Smith, Head of Computer Science,
Bishop Young C of E Academy

Edexcel GCSE 1CP2

Board swap discounts available

This series of six units is designed to provide teachers with tailored material to deliver the theory section of the 2020 Edexcel Computer Science (9-1) specification 1CP2. Each unit comprehensively covers the relevant theory content required for the written examination.

Each unit includes imaginative exercises and homework ideas, along with beautifully presented PowerPoint slides to accompany detailed lesson plans. The homework questions in each unit are written in an examination style to best prepare students for an end-of-unit assessment test. Full answers are included. Unit 5 is **FREE.**

Unit 5: Issues and impact – FREE

This unit covers the content from Topic 5 of the latest 1CP2 specification. It begins by looking at the environmental issues with the use of digital devices including the replacement cycle and disposal. The ethical implications of AI, machine learning and robotics are covered with case studies alongside the use of personal data. Intellectual property is covered through the appropriate legislation before looking at cybersecurity. Malware and various methods to protect digital systems against such threats are covered in the final lesson.

At the end of the unit, students sit an assessment test comprising questions similar to those found on the Edexcel exam paper.

Lesson 1: Environmental issues
Lesson 2: Ethical issues
Lesson 3: Legislation and privacy
Lesson 4: Cyber security
Lesson 5: Assessment
This is a free unit. Order online.

Unit 1: Computational thinking

FREE LESSON
Lesson 1: Decomposition and abstraction
Lesson 2: Developing algorithms using flowcharts
Lesson 3: Developing algorithms using pseudocode
Lesson 4: Algorithm output, errors and trace tables
Lesson 5: Searching algorithms
Lesson 6: Sorting algorithms
Lesson 7: Truth tables
Lesson 8: Assessment

Unit 2: Data

Lesson 1: Storage units and binary numbers
Lesson 2: Binary arithmetic and hexadecimal
Lesson 3: Binary shifts and two's complement
Lesson 4: ASCII
FREE LESSON Lesson 5: Images
Lesson 6: Sound
Lesson 7: Compression
Lesson 8: Assessment

Unit 3: Computers

This unit covers all of Topic 3: Computers of the Edexcel GCSE (9-1) Computer Science specification 1CP2. The first three lessons cover the components of a computer system and their function, including the role of the CPU components. A lesson on the operating system follows with coverage of utility and simulation software. The final lesson describes high-level and low-level programming languages, the use of an assembler and the functions of a compiler and interpreter, giving the advantages and disadvantages of each.

Lesson 1: Components of a computer system
Lesson 2: The CPU and the Fetch execute cycle
FREE LESSON Lesson 3: Secondary storage
Lesson 4: Operating system
Lesson 5: Utility software
Lesson 6: Identifying vulnerabilities
Lesson 7: Programming languages
Lesson 8: Assessment

Unit 4: Networks

This unit is subdivided into six learning hours spread across six lessons, plus a test, in order to fit with most school timetables. It is a theoretical unit covering Topic 4 of the Edexcel GCSE (9-1) 1CP2 Computer Science specification. Each lesson contains a worksheet to be done in class to consolidate students' knowledge and understanding, as well as a homework sheet to give them plenty of practice in answering exam-type questions.

The unit starts with a description of how the Internet is structured, and what is meant by the World Wide Web. It also covers wireless networks. Lesson 2 covers different types of network (LAN and WAN) and different network topologies, and Lesson 3 describes the role of different protocols and the layers in the TCP/IP protocol stack. The lessons move on to network security issues and threats, with a look at different ways our networks can be made more secure.

FREE LESSON Lesson 1: LANs and WAN
Lesson 2: The Internet
Lesson 3: Wired and wireless connections
Lesson 4: Protocols and layers
Lesson 5: Network topologies
Lesson 6: Network security
Lesson 7: Assessment

Unit 6: Programming

This unit is designed to cover all of the programming required for Paper 2. It contains questions and exercises that are in a similar format to those that students will experience in the practical examination. Completed and partial programming solutions in Python are provided to replicate the 'practical onscreen assessment' environment.

The first lesson in this unit covers data types and arithmetic operations. Sequence, selection and iteration are covered in the next two lessons, followed by lessons on arrays, subprograms, errors and testing, user input and validation. The final lesson covers reading from and writing to a text file.

Although the lessons can be delivered without students having to use computers, they will benefit from translating their pseudocode solutions to program code and testing them. All the worksheets contain exercises which provide opportunities for practical programming in the language of choice. Sample solutions are provided in Python to many exercises

FREE LESSON Lesson 1: Data types and operations
Lesson 2: Sequence and selection
Lesson 3: Iteration
Lesson 4: Arrays and lists
Lesson 5: Subprograms
Lesson 6: Errors and testing
Lesson 7: Validation
Lesson 8: Files

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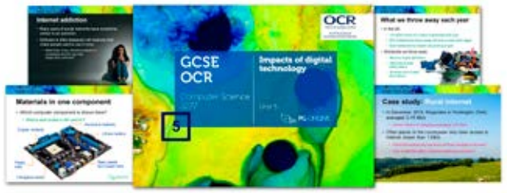
Unit 5: Impacts of digital technology – FREE

This comprehensive, free teaching unit is subdivided into three learning hours plus an end of unit assessment. It is a theoretical unit covering the latest OCR GCSE J277 Computer Science specification section 1.6. It begins by describing key examples of ethical, cultural and environmental considerations in relation to selected Computer Science technologies. The unit continues to focus on licencing and specific legislation related to Computer Science.



Lesson 1: Ethical and cultural issues
Lesson 2: Environmental issues
Lesson 3: Legislation and privacy
Lesson 4: Assessment
This is a free unit. Order online.

Unit 1: Systems architecture

This unit fully resources the teaching of four topics that are ideal as an introduction to the Computer Science course, or as a discrete unit later in the order of study.

The unit begins by looking at the various components of the CPU used in the Von Neumann architecture. Subsequent lessons build on the fundamentals covered at KS3 in our Understanding Computers unit, concentrating on RAM, ROM, cache, registers and the need for virtual memory. The unit concludes by examining the need for secondary storage devices and their practical advantages in given applications.

Lesson 1: Architecture of the CPU
Lesson 2: CPU performance
Lesson 3: Memory
FREE LESSON Lesson 4: Secondary storage
Lesson 5: Assessment

Unit 2: Data representation

The unit is subdivided into six topics spread across six lessons, plus a test, in order to fit with most school timetables. Each comprehensive lesson contains a worksheet to be done in class to consolidate students' knowledge and understanding, as well as a homework sheet to give them plenty of practice in answering exam-style questions. The conversion of integers from denary to binary is covered in the first lessons, together with simple binary addition, overflow and shifts. In subsequent lessons, the use of hexadecimal numbers and the binary representation of characters is described. Representation of images and sound, and compression techniques are covered in three separate lessons. In the final lesson students sit an assessment test comprising questions similar to those found on the OCR exam paper.

Lesson 1: Units of data storage and binary numbers
Lesson 2: Binary arithmetic and hexadecimal
Lesson 3: Characters
FREE LESSON Lesson 4: Images
Lesson 5: Sound
Lesson 6: Compression
Lesson 7: Assessment

Unit 3: Networks, connections and protocols

This unit is subdivided into six learning hours spread across six lessons, including a test, in order to fit with most school timetables. It is a theoretical unit covering Section 1.3 of the latest OCR GCSE J277 Computing specification.

The unit begins by explaining the Internet and IP addressing, with practical exercises to help students understand the role of packet switching and DNS services. The lessons move on to look at star and mesh LAN network topologies and Ethernet. Wireless networking and encryption are covered in subsequent lessons. Client-server networks and hosting are addressed with a final lesson describing common protocols and the concept of layers. At the end of the unit, students sit an assessment test comprising questions similar to those found on the OCR exam paper.

Lesson 1: The Internet and wide area networks
Lesson 2: Local Area Networks
Lesson 3: Wireless networking
FREE LESSON Lesson 4: Client-server and peer-to-peer networks
Lesson 5: Protocols and layers
Lesson 6: Assessment

Unit 4: Network security and systems software

This short unit is subdivided into four topics plus an examination style test. It is a theoretical unit covering Sections 1.4 and 1.5 of the latest OCR GCSE J277 Computing specification.

This unit begins by looking at the threats and vulnerabilities of computer systems and programs, including social engineering and the concept of SQL injection. Encryption and penetration testing are covered as examples of various methods of preventing vulnerabilities. The unit continues to focus on operating systems software, their function and typical utility software programs including defragmentation and compression programs.

FREE LESSON Lesson 1: Network threats
Lesson 2: Identifying and preventing vulnerabilities
Lesson 3: Operating systems software
Lesson 4: Utility software
Lesson 5: Assessment

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Julia Vale, Assistant Head Teacher,
Court Moor School

Unit 6: Algorithms

This unit begins by looking at computational thinking, including abstraction and decomposition. Two lessons are given to interpreting and comparing relevant searching and sorting algorithms including the merge and insertion sorts. These are written in the new OCR Examination Reference Language (ERL). Practical experience of writing, tracing and modelling algorithms using pseudocode and flowcharts is then provided. Students are also be given ample practical experience of correcting and completing algorithms (including debugging and testing) in worksheets and homework tasks.

Lesson 1: Computational thinking
Lesson 2: Searching algorithms
Lesson 3: Sorting algorithms
Lesson 4: Developing algorithms using flowcharts
FREE LESSON Lesson 5: Developing algorithms using pseudocode
Lesson 6: Interpret, correct and complete algorithms
Lesson 7: Assessment

Unit 7: Programming

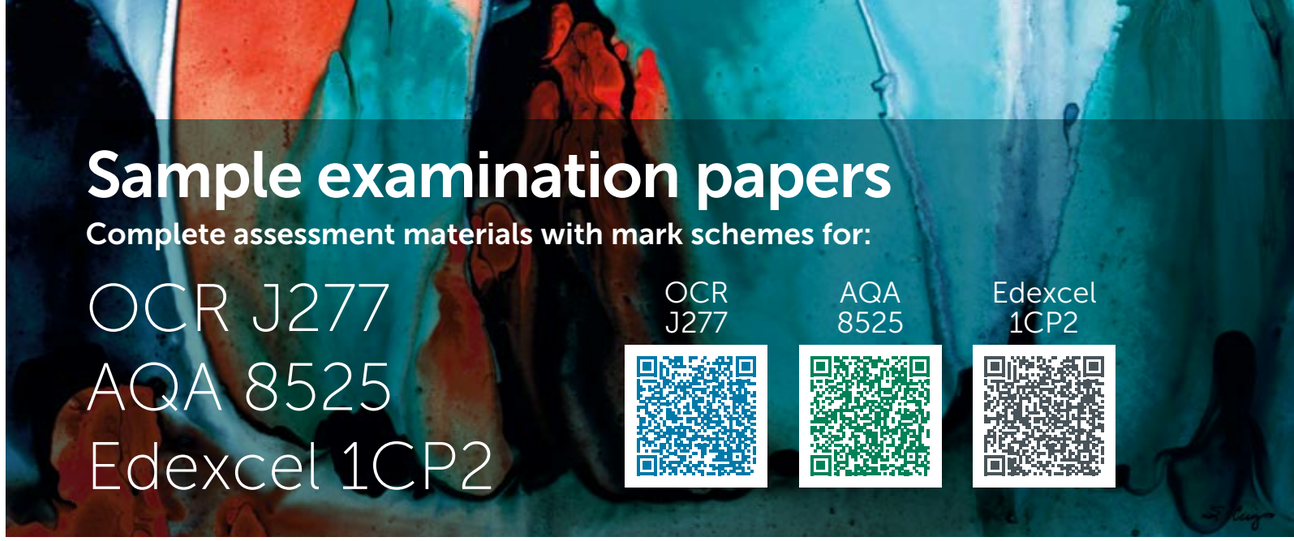
This programming unit covers the theoretical aspects of Section 2.2 of the latest OCR GCSE J277 Computer Science specification, covering all the knowledge and skills that students will need to tackle exam questions in Paper 2. The basic programming constructs are covered as well as string manipulation and file handling. Iteration and arrays are subsequently covered, before examining the use of procedures and functions to structure code. Finally, records and the use of SQL to search for data are covered. The unit is independent of any particular programming language but a basic knowledge and practical experience of programming in a language such as Python, VB or Small Basic is assumed.

FREE LESSON Lesson 1: Programming fundamentals
Lesson 2: Sequence and selection
Lesson 3: Iteration
Lesson 4: Arrays
Lesson 5: Procedures and functions
Lesson 6: Records and files
Lesson 7: SQL
Lesson 8: Assessment

Unit 8: Logic and languages

This unit begins with a lesson on Boolean logic diagrams and truth tables. Testing and error handling is covered using practical examples, including the use of the common tools and functions of an IDE. The unit concludes by looking at programming language classifications including translators and low-level languages. A test is provided with GCSE style questions to assess understanding across all lessons in the unit.

Lesson 1: Logic diagrams and truth tables
FREE LESSON Lesson 2: Defensive design
Lesson 3: Errors and testing
Lesson 4: Translators and facilities of languages
Lesson 5: The Integrated Development Environment
Lesson 6: Assessment



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Lesson 1: Automated systems
Lesson 2: Robotics
Lesson 3: Artificial intelligence
Assessment
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Unit 1: Data representation

This unit is subdivided into seven learning hours plus an end-of-unit assessment. It is a theoretical unit covering the latest Cambridge IGCSE 0478 / 0984 and O level 2210 Computer Science specifications.

Binary systems and hexadecimal systems are covered along with conversions with denary numbers. Binary additions and overflow errors are also considered along with logical binary shifts and two's complement representations.

The second half of the unit covers text, sound and images. ASCII and Unicode are considered as character sets. Sound sampling and the effects of sample rate and resolution are covered. For images, the concepts of resolution, colour depth and the effects these on file size and resolution are all considered. The necessary units of data storage along with file size calculations and compression are also covered in the second half of the unit.

At the end of the unit an assessment test is given comprising questions similar to those found on the IGCSE exam paper.

Lesson 1: Binary systems
Lesson 2: Hexadecimal
Lesson 3: Binary shifts and two's complement
Lesson 4: ASCII and Unicode
Lesson 5: Sound
FREE LESSON Lesson 6: Images
Lesson 7: Data storage and compression
Assessment

Unit 2: Data transmission and encryption

This unit starts by considering packets of data and their structure. It then extends to the different methods of data transmission, including serial, parallel, simplex, half and full-duplex. The universal serial bus is considered along with the benefits and drawbacks of the interface. Lesson 3 allows students to understand methods of error detection including parity checks, echo checks and checksums. ISBNs are given as examples of check digit use. The final lesson deals with both asymmetric and symmetric encryption.

Lesson 1: Data packets
Lesson 2: Data transmission
FREE LESSON Lesson 3: Error detection
Lesson 4: Encryption
Assessment

Unit 3: Computer architecture and storage

This unit covers both the topics of computer architecture and data storage. The first lesson considers CPU architecture including key components such as the ALU and Control Unit and key registers such as the PC, MAR, MDR, CIR and accumulator. In the second lesson, the factors that affect CPU performance are covered. Lessons 3 and 4 cover embedded systems, instruction sets and memory. Finally, secondary storage, virtual memory and cloud storage are all considered in the final two lessons.

Lesson 1: CPU architecture
Lesson 2: CPU performance and buses
Lesson 3: Embedded systems and instruction sets
FREE LESSON Lesson 4: Memory
Lesson 5: Secondary storage
Lesson 6: Cloud storage
Assessment

Unit 4: Input and output devices

Unit 4 covers the large number of input and output devices that are required by the specification. All key input and output devices are introduced, with a special focus on the technologies that students may have less understanding of such as 2D and 3D scanners, actuators and various sensors such as accelerometer, infra-red and proximity sensors. Students will also be shown how to identify the type of data captured by each sensor. Finally, an end of unit final assessment test will cover all aspects of the unit.

Lesson 1: Manual input devices
Lesson 2: Scanners and cameras
Lesson 3: Sensors
FREE LESSON Lesson 4: Output devices
Lesson 5: Printers
Assessment

Unit 5: Networks and the Internet

This unit covers both the network hardware and internet components of the specification. Students cover network hardware with both MAC and IP addresses. They then move on to considering how the internet and world wide web work along with web browsing and the technologies behind it such as URLs, HTTP/S and HTML. The role of cookies, DNS and web servers are also covered in lesson 4, followed by cyber security, including how attacks are carried out and the preventative solutions. The final lesson discusses digital currencies and blockchain technologies.

FREE LESSON Lesson 1: Network hardware
Lesson 2: MAC and IP addresses
Lesson 3: The internet and web
Lesson 4: Web technologies and cookies
Lesson 5: Cyber security threats
Lesson 6: Cyber security solutions
Lesson 7: Digital currency
Assessment

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Unit 6: Software

System software, application software and operating systems are considered in the first two lessons. The functions of operating systems are carefully studied, including file and memory management, multitasking and system security. Lesson 3 considers the role and operation of interrupts. Lesson 4 considers both high-level and low-level languages along with the advantages and disadvantages of each. Compilers and interpreters are also covered in this lesson. The final lesson looks at IDEs.

FREE LESSON Lesson 1: Types of software
Lesson 2: Operating systems
Lesson 3: Interrupts
Lesson 4: Languages and translators
Lesson 5: IDEs
Assessment

Unit 8: Algorithm design and problem solving

The development life cycle gives students an appreciation of some of the techniques required when developing programs. Lessons 2 and 3 introduce students to algorithms using both flowcharts and pseudocode. Lesson 4 demonstrates standard algorithms for linear searches, bubble sorts, counting and averages. Common validation and verifications checks are followed by the use of testing and trace tables, including abnormal, extreme and boundary data items. Finally, students are shown how to refine algorithms.

Lesson 1: Development lifecycle
FREE LESSON Lesson 2: Algorithms and flowcharts
Lesson 3: Algorithms and pseudocode
Lesson 4: Standard algorithms
Lesson 5: Validation and verification
Lesson 6: Testing and trace tables
Lesson 7: Creating and refining algorithms
Assessment

Unit 9: Key programming concepts

This first programming unit assumes that students have no knowledge, however, it progresses quickly on the assumption that many students will already have some experience of programming. Key programming concepts such as data types, variables and constants are dealt with in the first lesson. Selections using IF and CASE statements are followed with practical examples of iteration, including count-controlled, pre-condition and post-condition loops. Arrays are considered in lesson 4 with the final lesson 5 covering both string manipulation and library routines.

FREE LESSON Lesson 1: Data types and operations
Lesson 2: Sequence and selection
Lesson 3: Iteration
Lesson 4: Arrays
Lesson 5: Library routines
Assessment

Unit 10: Advanced programming and databases

This second programming unit covers a selection of more advanced topics. The first lesson begins by looking at procedures and functions. Students are then introduced to file handling techniques. A lesson on Boolean logic covers all the common gates including NAND, NOR and XOR. The final lesson concludes the programming unit with a look at both databases and SQL. SELECT queries are covered in depth through practical examples.

Lesson 1: Procedures and functions
Lesson 2: File handling
Lesson 3: Boolean logic
FREE LESSON Lesson 4: Maintainable programs
Lesson 5: Databases and SQL
Assessment

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R093 Pack A: Media industry and product design

The resources are subdivided into seven topics plus an end-of-unit assessment. Each topic contains enough content for one to two lessons of material.

The first two topics covers sectors, products and job roles in the media industry. Topic 3 considers style, content and layout and how these are linked to purpose. Client requirements and brief formats are covered in Topic 4 and both primary and secondary research methods are covered in Topic 5. A thorough consideration of media codes is given in the final two topics of the pack, including new topics for this specification such as mise-en-scène. A final assessment gives students an opportunity to sit an assessment test comprising questions of a similar style to those found on an R093 Creative iMedia exam paper.

FREE LESSON Topic 1: Sectors and products of the media industry
Topic 2: Job roles in the media industry
Topic 3: Purpose, style, content and layout
Topic 4: Client requirements and audience
Topic 5: Research
Topic 6: Media codes
Topic 7: Cameras and lighting
Unit assessment

R093 Pack B: Pre-production planning

This pack covers Topic Area 3 sections 3.1, 3.2 and 3.3 including documents used to design and plan media products such as storyboards, scripts and visualisation diagrams.

Workplans and production schedules are covered in Topic 1 whilst the remaining seven topics look at the different pre-production planning documents that are used when making media products. Topic 2 covers mind maps whilst Mood boards are given in Topic 3. Scripts and storyboards are covered in Topic 4 and 5 with a heavy emphasis on television and film production. Topic 6 considers visualisation diagrams and will be very useful for the mandatory graphics unit. In Topic 7, wireframes and flowcharts are covered – in particular for use in web design. Finally, in Topic 8, the hardware and software required to make pre-production documents is considered. The final assessment gives students an assessment test comprising questions of a similar style to those found on an iMedia exam paper.

Topic 1: Workplans
Topic 2: Mind maps
FREE LESSON Topic 3: Mood boards
Topic 4: Scripts
Topic 5: Storyboards
Topic 6: Visualisation diagrams and asset logs
Topic 7: Wireframes and flowcharts
Topic 8: Hardware and software
Unit assessment

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R093 Pack C: Legal issues and distribution

This pack covers Topic Area 3 section 3.4 and Topic Area 4 on distribution considerations.

The first topic considers the legal considerations to protect individuals, including relevant laws such as privacy, permissions and defamation. The topic also considers regulation, certification and classification, including the role of the ASA, Ofcom, BBFC and PEGI. Intellectual Property is carefully considered in Topic 2, including copyright, trademarks and patents. Health and safety is covered in Topic 3 with a focus on risk assessments and location recces. Topic 4 considers the different online and physical platforms available along with physical media. Finally, different file types and formats are considered in Topic 5. The final assessment gives students an assessment test comprising questions of a similar style to those found on an R093 Creative iMedia exam paper.

FREE LESSON
- Topic 1: Legal issues and regulation
- Topic 2: Intellectual property
- Topic 3: Health and Safety
- Topic 4: Distribution platforms and media
- Topic 5: File formats
- Unit assessment

R094 Pack A: Developing visual identity and assets

This unit covers Topic Area 1 and Topic Area 2.1, 2.2 and 2.3 of unit R094.

The first two topics begin by looking at the purpose, elements and design of visual identity including logos, typography, colour palettes and layout. Topic 3 carefully considers further design and layout concepts such as white space, alignment and colour systems. Technical properties of graphics file formats are covered in Topic 4. Topic 5 covers the sourcing of assets along with licences and permissions. Finally, Topic 6 considers the pre-production documents that are relevant to digital graphics such as mood boards, concept sketches and visualisation diagrams.

No specific design software is required for this unit.

FREE LESSON
- Topic 1: Purpose of visual identity
- Topic 2: Visual identity components and elements
- Topic 3: Design and layout
- Topic 4: File types and formats
- Topic 5: Licences and permissions
- Topic 6: Planning visual identity and digital graphics

R094 Pack B: Creating visual identity and digital graphics

This pack covers Topic Area 3 of Unit R094.

Topic 1 of this unit begins by looking at how assets are sourced. In the second topic, students look at how to create a number of different logos. Students then cover how to compile an image using a range of design tools and techniques. Coverage of file formats and resolution is covered in the final lesson.

Lesson resources include the original .PSD Photoshop files, containing each individual layer which can be used for demonstration and exemplars. Exercises and examples are written for use with Photoshop and GIMP software.

FREE LESSON
- Topic 1: Asset sourcing and creating
- Topic 2: Creating a visual identity
- Topic 3: Compiling an image
- Topic 4: Basic tools
- Topic 5: Isolating text and advanced tools
- Topic 6: Retouching and other tools
- Topic 7: Saving and exporting

R095 Pack A: Planning characters and comics

The first topic considers the types and features of characters that are used in comics, including cartoons, doodles, photorealistic drawing, geometric shapes and minimalist types. The characteristics and conventions used in comics are covered in the second topic, including personality, character trope and superpowers. The third topic studies the conventions of comic design and layout, including colour, typography and text styling. The fourth and fifth topics cover the conventions for story telling within comics. This includes panels, communication and narration. The final lesson considers the resources and software that will be used to create comics.

FREE LESSON
- Topic 1: Types and features of character
- Topic 2: Characteristics and conventions
- Topic 3: Colour, typography and communication bubbles
- Topic 4: Panels and layout
- Topic 5: Narration and creativity
- Topic 6: Resources and software

R095 Pack B: Pre-production and creating comic components

Topic one considers the pre-production and planning documentation required for characters and comics including character design and profiles. The second lesson considers the use of story, scripts and storyboards for comic design. The third lesson considers further pre-production and planning for comics, including plot structure, story arc, panel shape and placement, and panel shot types and their meaning. The final two topics cover the techniques needed to obtain and create components for use within comics. This includes the sourcing, editing and saving of assets.

FREE LESSON
- Topic 1: Pre-production for characters
- Topic 2: Story scripts
- Topic 3: Storyboards and panels
- Topic 4: Panel placement and content
- Topic 5: Tools for digital character creation
- Topic 6: Techniques for creating assets

R095 Pack C: Creating, publishing and reviewing comics

The first two topics of this unit cover the technical skills required to create comics. This includes the creation of panel layouts, typographical styles, graphical assets, focal points and story flow. The second topic considers how scripts and storyboards are transferred to a comic strip, including the integration of speech bubbles, thought bubbles, narration and captions. Topic three covers the saving and publishing of characters and comics. A thorough consideration of the techniques to check the technical properties of characters and comics is given in Topic four. The last two topics show students how to review their characters and comics and how to suggest improvements and further developments.

- Topic 1: Combining assets into comic panels
- Topic 2: Transferring a script into a comic strip
- Topic 3: Techniques to save and publish characters and comics
- Topic 4: Checking characters and comics
- FREE LESSON Topic 5: Review characters and comics
- Topic 6: Improvements and further developments

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R097 Pack A: Planning interactive digital media

The first two topics cover the format types, content and hardware used for interactive digital media, including images, video, forms and navigation buttons. The features of interactive digital media are covered in Topic 3 including GUIs, interaction styles and accessibility. Conventions and creativity are considered in Topic 4. Topic 5 has a thorough consideration of the hardware and software used to create interactive digital media. Pre-production and planning documentation are all covered in the final three topics. These include wireframes, master page/template design, storyboards, navigation and hierarchy diagrams, and asset tables.

FREE LESSON Topic 1: Interactive formats and hardware
Topic 2: Interactive digital media content
Topic 3: Features of interactive digital media design
Topic 4: Conventions and creativity
Topic 5: Hardware and software
Topic 6: Wireframes, master pages and template design
Topic 7: Storyboards
Topic 8: Further pre-production planning

R097 Pack B: Technical skills for asset creation

This second pack for R097 starts by covering the sourcing of suitable assets. The next three topics consider the asset types of static images, audio and moving image techniques such as cut, split, trim and extend. The optimisation of file size and formats is also covered. Finally, interactive assets including diagrams, maps, buttons, banners, navigation bars and forms are covered in Topic 5.

FREE LESSON Topic 1: Sourcing assets, vectors and bitmaps
Topic 2: Techniques to repurpose image assets
Topic 3: Audio assets
Topic 4: Moving image assets
Topic 5: Interactive assets

R097 Pack C: Creating, publishing and reviewing

The first topic considers the folder structure and file naming conventions that students need to create. Topics 2 and 3 consider master pages and how they are constructed using presentation software. Content, controls, triggers and behaviours are all covered in the third topic followed by saving and exporting. A thorough consideration of the techniques to test interactive digital media is given in Topic 5. The last two topics show students how to review their interactive digital media product and how to suggest improvements and further developments.

Topic 1: Folders structure and exporting
Topic 2: Master pages and template
Topic 3: Content and controls
Topic 4: Triggers and behaviours in PowerPoint
Topic 5: Testing and performance
FREE LESSON Topic 6: Review
Topic 7: Improvements and further developments

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> Jennie Eyres, iMedia and digital media consultant

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iMedia R093 Sample Examination Papers (Pack of 3)

NEW

Each of the three papers and mark schemes included in this pack are designed specifically for the externally examined iMedia R093 specification with correctly apportioned sections, command words and mark weightings.

The three papers have been carefully written to ensure that between them, every element of the specification is covered either directly in the questions, or in the answers students may give. Together, they will provide ample opportunity for revision purposes.

Paper 1 plus detailed iMedia style mark scheme FREE SAMPLE*
Paper 2 plus detailed iMedia style mark scheme
Paper 3 plus detailed iMedia style mark scheme
Specification map to cross reference examination coverage
Editable DOC format & PDF format suitable for booklet printing

*Mark schemes only available in paid-for versions

Published April 2022

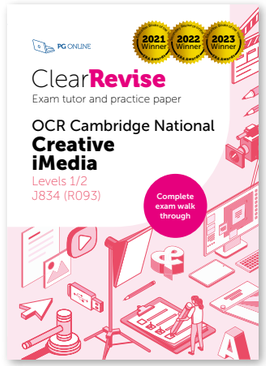
ClearRevise OCR iMedia R093/R094

ISBN: 978-1-910523-27-8 144pp £8 (volume discounts available)

Absolute clarity is the aim with a new generation of revision guide. This clear study guide has been expertly compiled and edited by subject specialists, media industry professionals, highly experienced examiners and a good dollop of scientific research into what makes revision most effective.

Past examination questions are essential to good preparation, improving understanding and confidence. This handy-sized book has combined revision with tips and more practice questions than you could shake a stick at. All the essential ingredients for getting a grade you can be really proud of.

Each specification topic has been referenced and distilled into the key points to make in an examination for top marks. Questions on all topics assessing knowledge, application and analysis are all specifically and carefully devised throughout this book.



Published May 2023

ClearRevise Exam Tutor OCR iMedia J834 (R093)

NEW

ISBN: 978-1-910523-89-6 80pp £8 (volume discounts available)

ClearRevise is all about making your revision easy. At the end of the course, doing practice papers is useful – but an exam tutor can make a big difference. This book helps provide support from both angles and will really help you to ace the exam.

The first section is your exam tutor. It shows you example questions with model answers. Just like a tutor, it gives you exam tips and lets you know what the examiner is looking for. Next, you are given similar questions from the same topic for you to have a go at, applying your knowledge and tips. With over 200 marks in this section and all the answers provided, you'll easily revise the topics as you go.

Lastly, there is a complete exam paper written in the same style as the live iMedia papers to try. It's exactly the same length and marks as the real exam, providing a realistic experience and a great opportunity to show how much you've progressed.

Best Seller

BTEC Level 1/2 Tech Award in Digital Information Technology

The BTEC course in Digital Information Technology provides an excellent pathway for those wishing to study an IT-related course without the technicalities of Computer Science. This series of eight new teaching units plus a textbook cover everything in Components 1-3 of the Level 1/2 BTEC in DIT. For the new BTEC textbooks, see pages 47 and 48 for details.

Existing centre users receive an upgrade discount

Component 1

Pack A: User Interface Design

This pack covers all the teaching required for Component 1, Learning outcome A - Investigate user interface design for individuals and organisations.

The key areas of the specification are broken down into six lessons which follow the order of the specification and assignment briefs. Types of interface, audience needs, design principles and efficient user interfaces are all covered.

Lesson presentations give students key information and examples, whilst worksheets allow them to attempt assessment tasks that replicate important elements of the activities that will be required in the assignment.

The resources demonstrate and provide practice in the skills required to assess different types of user interface.

FREE LESSON
- Topic 1: User Interfaces
- Topic 2: Factors and influences
- Topic 3: Audience needs
- Topic 4: Design principles
- Topic 5: Design psychology
- Topic 6: Efficient user interfaces
- Assessment

Pack B: Project Planning

This pack covers all the teaching required for Component 1 Learning outcomes B and C.

The key areas of the specification are broken down into five lessons which follow the order of the specification and assignment briefs. Project planning techniques, creating a project plan, creating an initial design, developing the user interface and reviews are all covered.

The resources demonstrate and provide practice in the skills required to create a project plan and design, develop and assess a user interface.

FREE LESSON
- Topic 1: Project planning techniques
- Topic 2: Creating project plans
- Topic 3: Initial designs
- Topic 4: Developing a user interface
- Topic 5: Review
- Assessment

Component 2

Pack A: Data collection and impact

This pack covers all the teaching required for Component 2 Learning outcome A.

The learning outcome is divided into seven topics covering all the required knowledge given in the specification and necessary for the assignment briefs. Characteristics of data and information, representing information, ensuring data is suitable for processing, data collection, quality of information, sectors that use data modelling and threats to individuals are all covered.

FREE LESSON
- Topic 1: Characteristics of data and information
- Topic 2: Representing information
- Topic 3: Ensuring data is suitable for processing
- Topic 4: Data collection
- Topic 5: Quality of information
- Topic 6: Sectors that use data modelling
- Topic 7: Threats to individuals
- Assessment

Pack B: Creating a dashboard

This pack covers all the teaching required for Component 2 Learning outcomes B and C.

The learning outcomes covered over six topics. The first topic covers spreadsheet basics which is useful to give students the foundations required later in later lessons. Data manipulation methods are covered in the second and third topics, including the functions required in the new specification such as COUNTA. Topics 4 and 5 give a comprehensive look at how a dashboard is produced covering all the methods given in the specification. Finally, Topic 6 shows students how to draw conclusions and consider how the presentation affects understanding.

FREE LESSON
- Topic 1: Spreadsheet basics
- Topic 2: Data manipulation methods
- Topic 3: Other processing methods
- Topic 4: Producing a dashboard
- Topic 5: Producing a dashboard using pivot tables
- Topic 6: Conclusions and reviewing presentation methods
- Assessment

BTEC Level 1/2 Tech Award DIT Sample Examination Papers (Pack of 3)

Each of the three papers and mark schemes included in this pack are designed specifically for the BTEC Level 1/2 specification in DIT with correctly apportioned sections, command words and mark weightings.

The three papers have been carefully written to ensure that between them, every element of the specification is covered either directly in the questions, or in the answers students may give. Together, they will provide ample opportunity for revision purposes.

- Paper 1 plus detailed BTEC-style mark scheme — FREE SAMPLE*
- Paper 2 plus detailed BTEC-style mark scheme
- Paper 3 plus detailed BTEC-style mark scheme
- Specification map to cross reference examination coverage
- Set format suitable for booklet printing

Mark schemes only available in paid-for versions

Get in touch to order your units

"I will say without a doubt the resources have been fantastic for both our A Level AND the new BTEC IT RQF courses. A huge thank you for the excellence of your materials and a level of customer service which is five stars.

Pamela Hearsum, Head of Computer Science, Peter Symonds College

"The PG Online resources resulted in student performance improving by a third in one year! These are the very best resources out there; I would absolutely recommend them to education professionals.

Marvin Richardson-Grubb, Head of Computer Science, The Mendip Studio School

Cumulative discounts:

2 – 5 units	–	10%
6 – 11 units	–	15%
12+ units	–	20%

Component 3

Pack D: Planning and communication – FREE

This free pack of resources takes students through both information flow diagrams and data flow diagrams in the first topic. Flowcharts and system diagrams are then considered in the following two topics. The final topic considers how tables are used to present data. Once the topics have been completed, there is a final assessment test of the topics.

Topic 1: Data flow diagrams
Topic 2: Flowcharts
Topic 3: System diagrams
Topic 4: Tables
Unit assessment
This is a free unit. Order online.

Pack A: Modern technologies

These resources contain appropriate case studies and scenarios to help illustrate how IT is used in business and industry. The first topic looks at communication technologies and networks before modern cloud storage, cloud computing and cloud technologies are discussed in the second topic. The third topic considers how cloud and 'traditional' systems are used together and the implications for organisations. Topics 4–6 consider the impact of modern technologies on teams and organisations.

FREE LESSON
Topic 1: Communication technologies
Topic 2: Cloud storage and computing
Topic 3: Using cloud technologies
Topic 4: Modern team working
Topic 5: Inclusivity and accessibility
Topic 6: Impacts of modern technologies
Unit assessment

Pack B: Cyber security

These resources cover cyber security over five topics plus an end-of-unit assessment. Each of the topics contain enough content for one to two lessons of material in addition to appropriate case studies and scenarios to help demonstrate the use of IT in business and industry. Motivations for system attacks and external threats to systems are dealt with in the first topic. Consideration, in the second topic, is then made to internal threats and the impacts of security breaches. The following two topics cover user access restrictions, data level protection and finding weaknesses in system security. The final topic considers how policy is used to help secure systems and data.

FREE LESSON
Topic 1: System attacks and threats
Topic 2: Internal threats and breaches
Topic 3: User restrictions and weaknesses
Topic 4: Data level protection
Topic 5: Policy, backups and data recovery
Unit assessment

Pack C: Wider implications of digital systems

These resources are subdivided into six topics plus an end-of-unit assessment. Each topic contains enough content for one to two lessons of material. The first two topics consider the use of shared data and the environmental impacts of IT. Topic 3 considers the importance of equal access to services and information and net neutrality. In Topic 4, acceptable use policies are considered along with the blurring of social and business boundaries, before data protection principles are considered in Topic 5. Finally, the criminal use of computer systems is covered in Topic 6.

FREE LESSON
Topic 1: Shared data
Topic 2: Environmental issues
Topic 3: Equal access and net neutrality
Topic 4: Acceptable use policies
Topic 5: Data protection
Topic 6: Criminal use of computer systems
Unit assessment

BTEC Level 3 National in Information Technology

endorsed for BTEC

Our series for the Level 3 BTEC qualification in IT covers all of Unit 1 of the qualification providing ample content and structure to deliver the externally assessed element of the course. Each pack contains carefully curated case studies and examination-style questions, each using the correct command words to provide realistic practice for students.

"I don't normally purchase resources but the BTEC resources were money well spent.

The BTEC resources are excellent and I have found them invaluable for teaching."

Lorraine Dickinson,
Head of Computer Science,
Wellfield Community School

Pack F: Issues – FREE

These resources cover the Issues of using IT systems over five topics plus an end-of-unit assessment. Each of the topics contain enough content for one to two lessons of material in addition to appropriate case studies and scenarios to help demonstrate the use of IT in business and industry. Moral and ethical issues are covered in Topics 1–2. In Topic 3, an in depth look at the different legislation and Acts that relate to IT misuse are given. Topic 4 considers the purpose, role and impact of codes of practice. Finally, in Topic 5, the legislation and guidelines related to accessibility, disability and equality are covered.

Topic 1: Privacy and ethical behaviour
Topic 2: Global and environmental issues
Topic 3: Current legislation
Topic 4: Moral and ethical factors
Topic 5: Equality and accessibility
Unit assessment
This is a free unit. Order online.

Pack A: Digital devices in IT systems

These resources contain appropriate case studies and scenarios to help illustrate how IT is used in business and industry. The first two topics look at digital devices, their functions and use. In the third topic, peripheral devices and media are considered. Topics 4–6 look at the concepts and implications software including operating systems, user interfaces, utility software and application software. The final two topics consider emerging technology in IT and how IT systems are chosen.

FREE LESSON
Topic 1: Digital devices
Topic 2: The function of digital devices
Topic 3: Peripheral devices and media
Topic 4: Operating systems
Topic 5: Choice and use of operating systems
Topic 6: Utility and application software
Topic 7: Emerging technologies
Topic 8: Choosing IT systems
Unit assessment

Pack B: Transmitting data

These resources contain enough content for one to two lessons of material in addition to appropriate case studies and scenarios to help demonstrate the use of IT in business and industry. The first two topics consider connectivity and the implications and impact of connection types. The following two topics then look at different types of network and the factors affecting the choice of network. Topic five looks at different protocols and other issues related to the transmission of data. Finally, the final topic covers drawing system diagrams.

FREE LESSON
Topic 1: Connectivity
Topic 2: Implications and impact of connection types
Topic 3: Types of network
Topic 4: Factors affecting the choice of network
Topic 5: Features and processes of data transmission
Topic 6: Drawing system diagrams
Unit assessment

Pack C: Operating online

These resources contain appropriate case studies and scenarios to help illustrate how IT is used in business and industry. The first two topics consider online systems along with their use and selection. The next lesson looks at online communities as a way of communication and interaction and the implications for individuals of their use. The final lesson looks at the implications for organisations of the use of online communities.

FREE LESSON
- Topic 1: Online systems
- Topic 2: Use and selection of online systems
- Topic 3: Interacting with online communities
- Topic 4: Organisations and online communities
- Unit assessment

Pack D: Protecting data and information

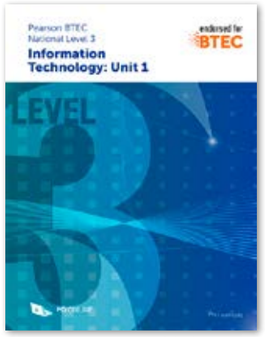
The first topic in this pack considers the threats to data, information and systems. This is followed by the second topic which looks at the impact of those threats. Protecting data is covered in the next four topics. The protection of systems, features of antivirus software and encryption methods are covered with BTEC style questioning and case studies. Finally, content on the impact on individuals and organisations of legislation and data protection are covered in Topics 5 and 6.

- Topic 1: Threats to data
- FREE LESSON Topic 2: Impact of threats to data, information and systems
- Topic 3: Methods of protecting data
- Topic 4: Encryption, protocols and digital certificates
- Topic 5: Role of legislation in protecting data
- Topic 6: Access control, backup and recovery
- Unit assessment

Pack E: Impact of IT systems

The first topic in this pack looks at online services with the second topic and third topics considering the impact of IT systems on organisations. The ways in which data is sourced and collected are discussed in the fourth topic which leads to the final topic of using and manipulating data. Once the topics have been completed, there is a final assessment test which contains BTEC Unit 1 style questions.

FREE LESSON
- Topic 1: Online services
- Topic 2: IT systems in organisations
- Topic 3: Impact of IT systems on organisations
- Topic 4: Sourcing and collecting data
- Topic 5: Using and manipulating data
- Unit assessment



Published February 2019

BTEC Level 3 National in Information Technology

SEE INSIDE

ISBN: 978-1-910523-15-5 192pp £17, PM Heathcote

The aim of this book is to provide comprehensive coverage of topics in Unit 1 of the BTEC Level 3 course in Information Technology in an interesting and approachable manner. Examples and case studies from real-life scenarios and events are used to create relevance and engage students. Reading and discussing articles from quality newspapers, whether printed or online, discussing relevant TV documentaries, noticing and analysing the use of digital technology in countless aspects of life, as well as learning from a textbook, are all going to contribute to a successful exam result.

The book is divided into six sections corresponding to the six Learning Aims outlined in the specification, complementing each of the PG Online teaching resource packs. These sections are divided into between four and eight chapters, each containing material that can be covered in one or two lessons.

Solutions to all questions and exercises are provided in a free teachers' pack available on our website.

Best Seller

OCR AS and A Level H046 / H446 Computer Science

OCR
Oxford Cambridge and RSA
An OCR endorsed teaching and learning tool

The current A Level specification poses new challenges for teachers, and at a time of significant change in our subject, time to plan or develop new skills or materials has become an increasingly scarce resource. In response to considerable demand, we have developed new and approved course material tailored to the OCR A Level specification which includes a series of 12 downloadable teaching units and a complete A Level textbook.

Similar to our KS3 and GCSE series, the OCR A Level units include detailed lesson plans, PowerPoint slides, worksheets, homework exercises and an end-of-unit assessment written in the style of an examination paper. The units and textbook are written in a linear style for students aiming to study the full A Level.

Unit 10 Computational thinking is **free.**

Grade improvement shown in A Level grades

Unit 10: Computational thinking – FREE

- Topic 1: Thinking abstractly
- Topic 2: Thinking ahead
- Topic 3: Thinking procedurally
- Topic 4: Thinking logically, thinking concurrently
- Topic 5: Problem recognition
- Topic 6: Problem solving
- End of unit assessment

This is a free unit. Order online.

The unit is subdivided into six topics and an end-of-unit assessment. Each topic may be spread over more than one lesson, especially if time is spent in the lessons going over homework tasks.

It is a theoretical unit covering the OCR Computer Science specification Section 2.2.1 Elements of Computational Thinking and Section 2.2.2 Computational methods. It describes what is meant by 'computational thinking' in its many forms and is designed to develop this skill with the aid of many practical examples related to problem recognition and decomposition, abstraction and algorithm design. It covers the topics of backtracking, data mining, heuristics, performance modelling, pipelining and visualisation.

> **Your A-Level resources for OCR have been fantastic for my students and me. One student maintains that if you just work through the book you'll get at least an A!**
>
> **[We got back in touch ...and she got an A!]**
>
> Joan Fuller, Computer Science Teacher, Heart of England School

> **I have all of your A Level and GCSE units as well as the A Level textbooks. I have found these materials absolutely invaluable in setting up and quickly establishing a new CS Department at a very traditional school which had not previously offered the subject.**
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> Jackie MacDonald, Department of Computer Science, Glenalmond College

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2 – 5 units	–	10%
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12+ units	–	20%

This is a **FREE** unit
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Unit 1: Components of a computer and their uses

FREE LESSON

- Topic 1: Structure and function of the processor
- Topic 2: The processor
- Topic 3: Types of processor
- Topic 4: Input devices
- Topic 5: Output devices
- Topic 6: Storage devices
- End of unit assessment

This unit is subdivided into six topics (plus a test) in order to fit with most school timetables. It is a theoretical unit covering all of Section 1.1 of the OCR H446 Computer Science specification.

The structure and function of the processor, types of processor and different processor architectures are covered in the first three topics. Topics 4-6 cover input, output and storage devices and how these can be applied to the solution of different problems.

Unit 2: Systems software and applications generation

FREE LESSON

- Topic 1: Functions of an operating system
- Topic 2: Types of operating system
- Topic 3: The nature of applications
- Topic 4: Program translators
- End of unit assessment

The unit is subdivided into four topics plus an examination-style assessment. It is a theoretical unit covering all of Section 1.2.1 and 1.2.2 of the OCR H446 Computer Science specification.

The functionality and purpose of the operating system and different types of operating system are covered in the first two topics. Topics 3-4 cover applications software, software licences and how source code is translated into executable code.

Unit 3: Software development

FREE LESSON

- Topic 1: Systems analysis methods
- Topic 2: Writing and following algorithms
- Topic 3: Programming paradigms
- Topic 4: Assembly language
- End of unit assessment

The unit is subdivided into four topics and an end-of-unit assessment. Each topic may be spread over more than one lesson, especially if time is spent in the lessons going over homework tasks.

It is a theoretical unit covering the OCR Computer Science specification sections 1.2.3 (Software development) and 1.2.4 (Types of programming language). The first two lessons cover systems analysis methods and algorithm design. The next two topics cover programming paradigms, assembly language and an introduction to the main concepts of object-oriented programming.

Unit 4: Exchanging data

FREE LESSON

- Topic 1: Compression, encryption and hashing
- Topic 2: Database concepts
- Topic 3: Relational databases and normalisation
- Topic 4: Introduction to SQL
- Topic 5: Defining and updating tables using SQL
- Topic 6: Transaction processing
- End of unit assessment

This unit covers Sections 1.3.1 and 1.3.2 of the 2015 H446 specification. The first lesson covers the topics of compression and encryption. This is followed by four lessons on databases and SQL, with a final lesson on transaction processing. Each of the six topics may be spread over more than one lesson, especially if time is spent in the lessons going over homework tasks. Practical database examples are based around Microsoft Access.

Unit 5: Networks and web technologies

FREE LESSON

- Topic 1: Structure of the Internet
- Topic 2: Internet communication
- Topic 3: Network security and threats
- Topic 4: HTML and CSS
- Topic 5: Web forms and JavaScript
- Topic 6: Search engine indexing
- Topic 7: Client-server and peer-to-peer
- End of unit assessment

This is a theoretical unit covering the structure of the Internet including DNS and IP addressing. Local Area Networks are also covered in the first topic. The second topic covers the role of packet switching and routers in the TCP/IP protocol stack. This is followed by a discussing of network threats and various methods of prevention. HTML and CSS is covered with practical examples in Topic 4, with web forms and JavaScript used to create more examples in Topic 5. Search engine indexing and Google's PageRank algorithm are comprehensively covered alongside client- and server-side processing in the final topics.

Unit 6: Data types

FREE LESSON

- Topic 1: Data types, binary and hexadecimal
- Topic 2: ASCII and Unicode
- Topic 3: Binary arithmetic
- Topic 4: Floating point arithmetic
- Topic 5: Bitwise manipulation and masks
- End of unit assessment

This unit covers the representation of data in Section 1.4.1 of the 2015 H446 specification. Five topics in this unit cover data representation of numbers and text, binary arithmetic using both fixed point and normalised floating point numbers, bitwise manipulation and masks.

Unit 7: Data structures

FREE LESSON

- Topic 1: Arrays, tuples and records
- Topic 2: Queues
- Topic 3: Lists and linked lists
- Topic 4: Stacks
- Topic 5: Hash tables
- Topic 6: Graphs
- Topic 7: Trees
- End of unit assessment

The unit is subdivided into seven topics plus a test. It covers all of Section 1.4.2 of the OCR A-Level specification H446. The unit gives practical and worked examples of each of the different abstract data structures including linked lists, graphs, stacks, queues, trees, binary search trees and hash tables. The function and practical application of each data type is discussed, with pseudocode and coded program solutions for relevant algorithms in VB and Python. A comprehensive examination-style assessment of the whole unit is included at the end of the topics.

Unit 8: Boolean algebra

- Topic 1: Logic gates and truth tables
- Topic 2: Simplifying Boolean expressions
- Topic 3: Karnaugh maps

FREE LESSON

- Topic 4: D-type flip-flops, half and full adders
- End of unit assessment

This is a theoretical unit covering all of Section 1.4.3 Boolean Algebra in the OCR A Level in Computer Science (H446) specification. The unit begins with two lessons on logic gates and Boolean algebra. The third lesson covers Karnaugh maps and the fourth topic, D-type flip-flops, half and full adders.

Unit 9: Legal, moral, ethical and cultural issues

FREE LESSON

- Topic 1: Computing related legislation
- Topic 2: Ethical, moral and cultural issues
- Topic 3: Privacy and censorship
- End of unit assessment

The unit is a theoretical unit covering Section 1.5 of the OCR A Level in Computer Science (H446) specification.

The first topic concentrates on the four main Acts and the way in which digital communication, storage and reproduction have inspired them, and are affected by them. The second topic explores the intersection of computer science with the philosophy of ethics and the implications of digital technology on human lives and the environment. The third topic looks at the balance between freedom of expression, and limiting harm or offense, in the context of digital media and its distribution over the internet. It also explores cultural issues around the presentation of information.

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> **Great set of resources for teachers, that fully engage the student. Your resources just work!**
>
> Andrew Clarke, Head of Computer Science, Holbrook Academy

Unit 11: Programming techniques

FREE LESSON

- Topic 1: The IDE and programming basics
- Topic 2: Selection
- Topic 3: Iteration
- Topic 4: Subroutines
- Topic 5: Recursion
- Topic 6: Use of object-oriented techniques
- End of unit assessment

This unit covers the use of an IDE to develop/debug a program, and the fundamentals of programming including recursion and the concepts of OOP, while recognising that some students may have had little previous experience of programming and others will already be seasoned programmers. It covers Section 2.2.1 of the OCR H446 Specification.

No one programming language is taught, leaving this choice up to the teacher. These theory lessons could be run in parallel with practical programming sessions, and for extra experience, it is recommended that students program the pseudocode solutions that they write.

Unit 12: Algorithms

- Topic 1: Analysis and design of algorithms
- Topic 2: Searching algorithms
- Topic 3: Bubble sort and insertion sort
- Topic 4: Merge sort and quicksort
- Topic 5: Graph traversal algorithms

FREE LESSON

- Topic 6: Optimisation algorithms
- End of unit assessment

This is a theoretical unit covering Section 2.3 Algorithms (except algorithms for stacks, queues, trees and linked lists which are covered in Unit 7). Searching and sorting algorithms (bubble sort, insertion sort, merge sort, quick sort) are explained in an interactive and practical way, with reference to Big-O notation in terms of time and space complexity. Topic 5 tackles standard algorithms for depth-first and breadth-first graph traversals. Optimisation algorithms, such as Dijkstra's shortest path algorithm and the A* algorithm are covered along with a discussion of intractable problems, in the final topic.

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> Naushin Mirza, Deputy Head of Department, St John Payne Catholic School

> **Wow, that is what you call service. (Clearly you know when teachers do their lesson planning for the week!)**
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> Fergal Moane, Assistant Headteacher, Sandringham School

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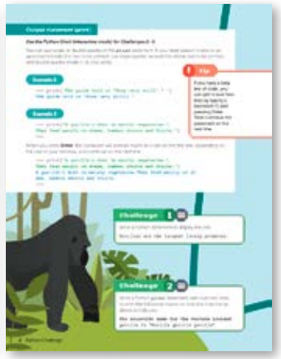
> **We use PG Online resources extensively and find them extremely helpful, especially with students new to Computer Science at A level.**
>
> Leslie Timms, Head of Computer Science, King Edward VI College

Best Seller

Programming skills guides for KS3, GCSE and A Level

Python & Visual Basic

Deliver the KS3, KS4 and KS5 qualifications with confidence. Provide outstanding support in practical programming with examples and solutions for every aspect of programming in Python and VB required to AS Level.



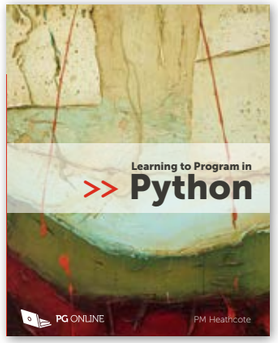
Python Challenge!

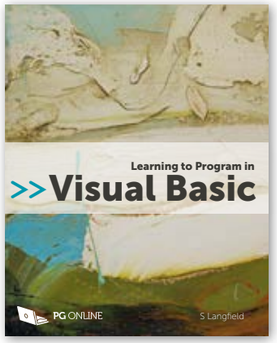
ISBN: 978-1-910523-35-3 96pp
£11 (volume discounts available) PM Heathcote

This book is a 'gamified' approach to Python, aimed at supporting GCSE and KS3 students, with complete coverage of the GCSE programming requirements.

Python syntax is simple to learn, but becoming an expert in writing programs to solve different kinds of problems takes a bit longer. That's why this book has a short explanation of each new statement or technique, followed by one or more examples and then loads of practice challenges. 35 challenges consist of partially written programs for students to complete.

SEE INSIDE





SEE INSIDE

SEE INSIDE

Learning to Program in Python

ISBN: 978-1-910523-11-7 128pp
£14 (volume discounts available) PM Heathcote

Learning to Program in VB

ISBN: 978-1-910523-18-6 136pp
£15 (volume discounts available) S Langfield

These books are straightforward guides to programming and programming techniques. They cover all of the practical programming skills that may be required from GCSE level and for those at AS Level with limited exposure to Python or VB. They are suitable for both experienced programmers, students or individuals with very little or no programming experience in other languages.

"The Python Challenge! book is fabulous! Exactly what I have been looking for. Thank for you saving me hours and hours!

Phil Morris,
Head of Computer Science,
Montgomery High School

"The Python book looks fantastic. So clear and comprehensive.

Mr Steve Foster,
Department of Computer Science,
Wollaston School

AQA AS and A Level 7516 / 7517

The current specifications for AS and A Level Computer Science pose new challenges for teachers. We have published new textbooks specifically designed and approved for the AQA specifications, as well as a series of downloadable teaching units. Units and textbooks have been written to allow AS and A Level students to be taught together.

Textbooks – see page 46 for details.

Units 2 and an Appendix unit for Year 2 are **FREE**

Grade improvement shown in A Level grades

AS Unit 1: Fundamentals of programming

This unit is divided into six topics, each corresponding to a chapter in Section 1 of the textbook AQA AS Level Computer Science. It introduces pseudocode and its application to the design of simple algorithms, as well as basic programming techniques in a procedural high-level language. This unit can be taught in parallel with practical programming lessons and will provide plenty of practice in writing and interpreting pseudocode algorithms.

FREE LESSON Topic 1: Programming basics
Topic 2: Selection
Topic 3: Iteration
Topic 4: Arrays
Topic 5: Subroutines
Topic 6: Files and exception handling
End of unit assessment

AS Unit 2: Problem solving and theory of computation – FREE

The six topics in this unit cover sections 3.3 and 3.4 of the AQA AS Level specification. Computational thinking, tackling logic problems, designing and testing algorithms are covered in a lively and practical way. The concepts of abstraction and automation are brought alive through interesting examples, and finite state machines are explained in simple terms, with plenty of practice examples throughout.

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
End of unit assessment
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AS Unit 3: Data representation

Six topics in this unit cover data representation of numbers, text, images and sound in sufficient detail to cover both the AS and the full A Level course, with the final topic explaining and giving examples of the uses of data compression and encryption. (Floating point binary is covered in a free Appendix unit for Year 2).
The beautifully illustrated PowerPoint slides and interactive style of the lesson plans will all help to ensure the class is fully engaged.

Topic 1: Number systems
Topic 2: Bits, bytes and binary
Topic 3: Binary arithmetic
FREE LESSON Topic 4: Bitmapped graphics
Topic 5: Representation of sound
Topic 6: Compression and encryption algorithms
End of unit assessment

AS Unit 4: Hardware and software

This is a theoretical unit covering all of Section 3.6 (Fundamentals of Computer Systems) in the AQA AS Specification 7516. The unit begins with a lesson on hardware and software and the classification of software. The role of an operating system is then covered, followed by lessons on the classification of programming languages as low-level and high-level, and programming language translators. The last two topics deal with logic gates and Boolean algebra.

Topic 1: Hardware and software
Topic 2: Role of an operating system
FREE LESSON Topic 3: Programming language classification
Topic 4: Programming language translators
Topic 5: Logic gates
Topic 6: Boolean algebra
End of unit assessment

AS Unit 5: Computer organisation and architecture

This unit begins by describing the internal hardware components of a computer, different architectures and the stored program concept. The fetch-execute cycle is explained including the role of the major components and dedicated registers used by the processor. Instruction sets and addressing are covered along with basic machine code and assembly language operations. External hardware devices and storage methods are also explained.

Topic 1: Internal computer hardware
Topic 2: The processor
Topic 3: The processor instruction set
Topic 4: Assembly language
Topic 5: Input - output devices
FREE LESSON Topic 6: Secondary storage devices
End of unit assessment

AS Unit 6: Communication: technology and consequences

The unit is a theoretical unit covering all of Section 3.8 and 3.9 of the AS specification. Students begin looking at communications methods, including baud rate, bit rate, bandwidth, latency and protocols. Further topics cover network topologies, client-server and peer-to-peer networking, and wireless networking. The unit concludes with two topics on communications and privacy and the social, legal and cultural issues in today's computing world.

Topic 1: Communication methods
Topic 2: Network topology
FREE LESSON Topic 3: Client-server and peer-to-peer
Topic 4: Wireless networking, CSMA and SSID
Topic 5: Communication and privacy
Topic 6: The challenges of the digital age
End of unit assessment

A Level Unit 7: Data structures

The unit covers Section 4.2 of the 7517 specification. (Arrays, records and files are covered in AS Unit 1.) The unit gives practical examples of each of the abstract data structures including queues, stacks, lists, graphs, trees, hash tables and dictionaries. The function application of each data type is discussed, with pseudocode and coded program solutions for some algorithms in VB or Python. Vectors and dot products and their application are covered in a final topic.

FREE LESSON Topic 1: Queues
Topic 2: Lists
Topic 3: Stacks
Topic 4: Hash tables and dictionaries
Topic 5: Graphs
Topic 6: Trees
Topic 7: Vectors
End of unit assessment

A Level Unit 8: Algorithms

This unit covers Section 4.3 Fundamentals of algorithms (except Section 4.3.3 Reverse Polish which is covered in Unit 9). Searching and sorting algorithms are covered in an interactive and practical way, with reference to Big-O notation in terms of time and space complexity. It also covers Section 4.1.1.15 on the role of stack frames in subroutine calls, and Section 4.1.1.16 on recursive techniques, practicing these with tree traversals and a depth-first graph traversal.

Topic 1: Recursive algorithms
Topic 2: Big-O notation
Topic 3: Searching and sorting
Topic 4: Graph traversal algorithms
FREE LESSON Topic 5: Optimisation algorithms
Topic 6: Limits of computation
End of unit assessment

A Level Unit 9: Regular languages

This unit covers Section 4.4.2 of the AQA 7517 specification. It begins by introducing practical examples of Mealy machines and continues to look at sets. The use of regular expressions in pattern recognition are covered in the third topic. Turing machines, Backus-Naur form and reverse Polish notation are covered in the final topics with practical worksheet exercises. Each topic is designed to cover 2-3 lessons with homework questions and an end-of-unit assessment test written in the style of an examination paper.

FREE LESSON 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
End of unit assessment

A Level Unit 10: The Internet

Internet functions including packet switching, DNS and the role of the router are covered in the first two topics of this unit. Symmetric and asymmetric encryption, and the use of digital signatures are covered in the following topic.

Standard application layer protocols such as SSH are covered with reference to the TCP/IP protocol stack. Subnetting, DHCP and Network Address Translation are covered in the penultimate topic, rounded off with a final topic on web CRUD and RESTful applications in relation to the client-server model.

Topic 1: Structure of the Internet
Topic 2: Packet switching and routers
FREE LESSON Topic 3: Internet security
Topic 4: TCP/IP, standard application layer protocols
Topic 5: IP addresses
Topic 6: Client server model
End of unit assessment

The worksheets are challenging and are fantastic for stretching able students.

Marie Shaw, Teacher of Computer Science, Queen Mary's College

The A level units do what they say on the box. A complete scheme of work, nothing else required! They have saved many hours of work and have helped students (and staff) understand the curriculum. Thank you.

Steve Casey, Head of Computing, The Burgate School

A Level Unit 11: Databases and software development

This unit covers entity relationship modelling, with particular focus on the steps involved in normalisation. SQL statements for the retrieval of data are covered in the third topic with reference to DDL and DML in defining and updating tables. The concept of deadlock is also covered. Finally, common software development models are described.

FREE LESSON 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
End of unit assessment

A Level Unit 12: OOP and functional programming

This unit covers the principles of Object Oriented Programming and functional programming. The theoretical principles such as polymorphism and encapsulation and inheritance are covered through practical examples. The unit continues to cover simple functions written in Haskell, including the use of functional composition to combine two functions. Finally, the use of functional programming in Big Data analysis is covered in Topic 6.

Topic 1: Basic concepts of Object Oriented Programming
Topic 2: Object oriented design principles
FREE LESSON Topic 3: Functional programming
Topic 4: Functional application
Topic 5: Lists in functional programming
Topic 6: Big Data
End of unit assessment

A Level Appendix: Floating-point numbers, Adders and D-type flip-flops – FREE

This free appendix contains two short sections of A Level material that may be covered in either Year 1 or Year 2 depending on your pattern of delivery. Floating point numbers, although part of the Year 2 specification, may be taught at AS as an extension to related AS Topics in the Data representation section for example. Adders and flip-flops may be delivered alongside Boolean logic.

The unit is subdivided into two topics, plus a test. It is a theoretical unit covering the relevant sections of the AQA 7517 A Level Computer Science specification.

Topic 1: Floating point numbers
Topic 2: Adders and D-type flip flops
Assessment test
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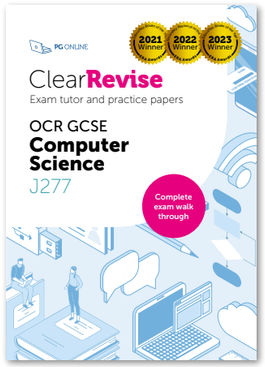

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Each chapter contains exercises, some new and some from past examination papers, which can be set as homework. Answers to all these are available to teachers only, in a Teachers' Supplement which can be ordered and downloaded via the website.

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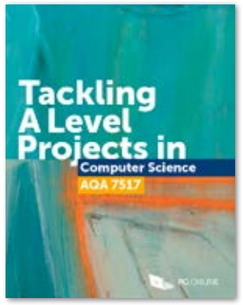

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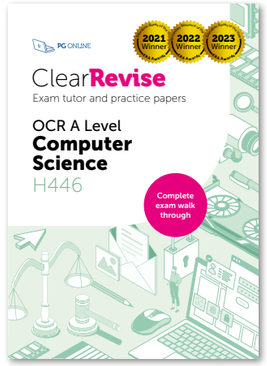

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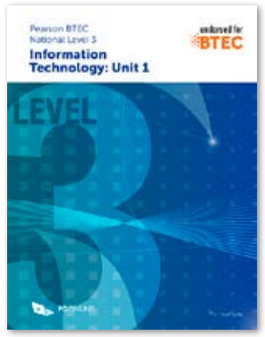

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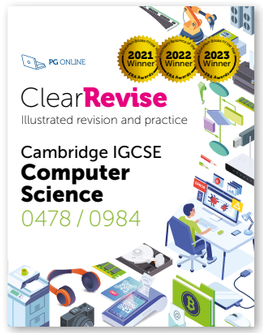

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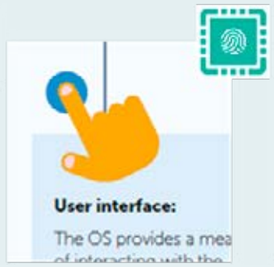

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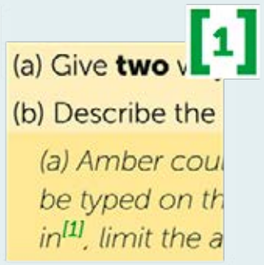

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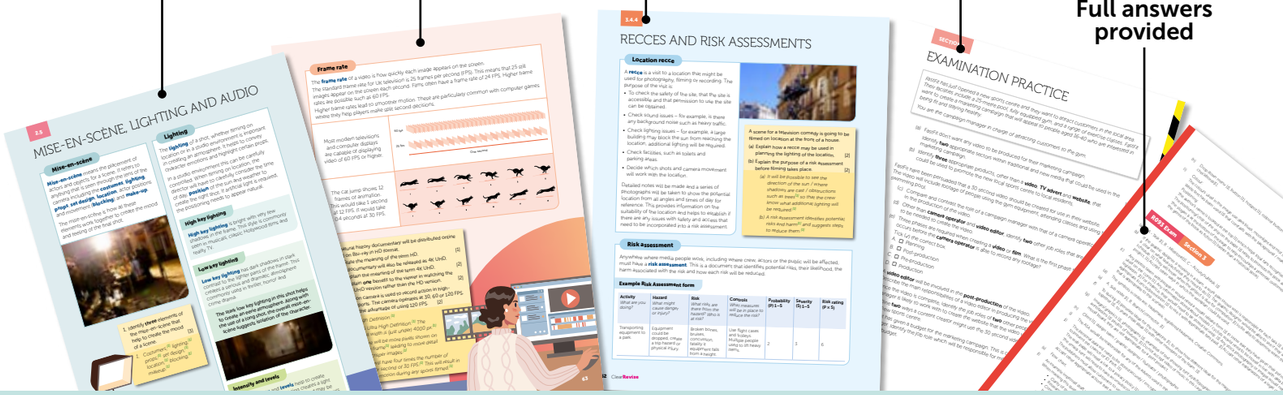

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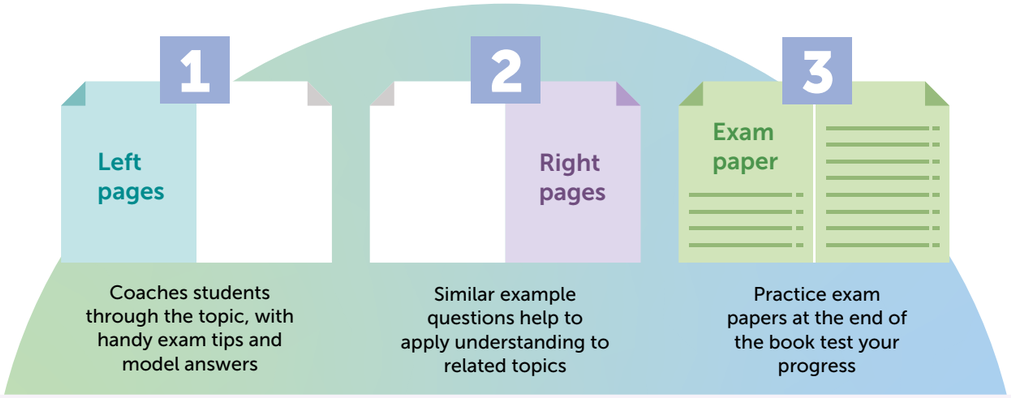

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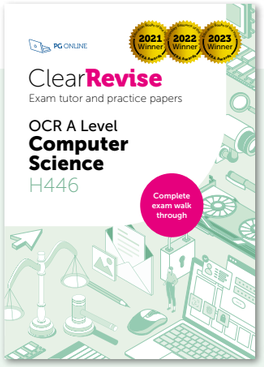

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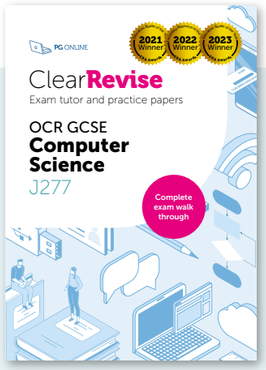

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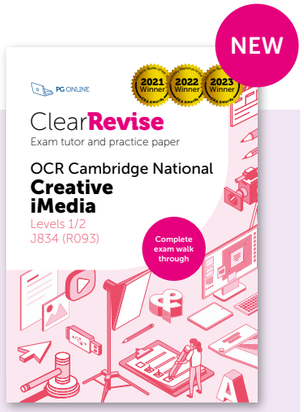

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