Component Chart

Foundation

Student Book

Feb 2010

Edexcel Linear 1
978-0-00-734018-7
Edexcel Modular 1
978-0-00-733986-0
AQA Modular 1 978-0-00-734002-6

Mar 2010

Edexcel Linear 2
978-0-00-734022-4
Edexcel Modular 2
978-0-00-733990-7
AQA Modular 2 978-0-00-734006-4

Homework Book

Includes Student Book CD-ROM

Apr 2010

Edexcel Linear 1
978-0-00-734019-4
Edexcel Modular 1
978-0-00-733987-7
AQA Modular 1
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May 2010

Edexcel Linear 2
978-0-00-734023-1
Edexcel Modular 2
978-0-00-733991-4
AQA Modular 2
978-0-00-734007-1

VLE version

Homework CD-ROM Foundation 1: Edexcel and AQA
978-0-00-735375-0 Apr 2010
Homework CD-ROM Foundation 2: Edexcel and AQA
978-0-00-735376-7 May 2010

Teacher's Pack

Feb 2010

Edexcel Linear 1
978-0-00-734020-0
Edexcel Modular 1
978-0-00-733988-4
AQA Modular 1 978-0-00-734004-0

May 2010

Edexcel Linear 2
978-0-00-734024-8
Edexcel Modular 2
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AQA Modular 2 978-0-00-734008-8

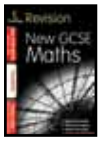
Interactive Book

Includes VLE version

Apr 2010
Interactive Book Foundation 1: Edexcel and AQA
978-0-00-734000-2

Jun 2010
Interactive Book Foundation 2: Edexcel and AQA
978-0-00-734001-9

Revision Guide



Apr 2010

Foundation: Edexcel, AQA and OCR 978-0-00-734098-9

Higher

Student Book

Feb 2010

Edexcel Linear 1
978-0-00-734026-2
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Edexcel Modular 2
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AQA Modular 2
978-0-00-734014-9

Homework CD-ROM Higher 1: Edexcel and AQA
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Teacher's Pack

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Edexcel Modular 2
978-0-00-733999-0
AQA Modular 2 978-0-00-734015-6

Interactive Book

May 2010
Interactive Book Higher 1: Edexcel and AQA
978-0-00-734032-3

June 2010
Interactive Book Higher 2: Edexcel and AQA
978-0-00-734033-0

Revision Guide

Apr 2010

Higher: Edexcel, AQA and OCR 978-0-00-734099-6

Working at Grades G–E

Workbook

Mar 2010

Edexcel Linear 1 978-0-00-734021-7
Edexcel Modular 1 978-0-00-733989-1
AQA Modular 1 978-0-00-734005-7

Apr 2010

Edexcel Linear 2 978-0-00-734025-5
Edexcel Modular 2 978-0-00-733993-8
AQA Modular 2 978-0-00-734009-5

Grade C Booster Workbook

May 2010
Edexcel Linear Grade C Booster Workbook
978-0-00-735382-8
Edexcel Modular Grade C Booster Workbook
978-0-00-735381-1
AQA Modular Grade C Booster Workbook
978-0-00-735383-5

Foundation and Higher

Assessment

Sept 2010

Assessment 1 978-0-00-734491-8

Sept 2010

Assessment 2 978-0-00-734492-5

What's Important To You?

At Collins, we speak to teachers every step of the way to make sure our resources are the best possible match to your needs. Here are the requirements that many teachers tell us are the most important, and how we can help:

✓ More practice

There are more questions than ever before in our Student Books and Homework Books. **Functional skills**, **problem solving** and new **assessing understanding** questions are flagged throughout, so your students will be confident answering any type of new question in the exam.

There is also further support to give students working at grades G–E a solid foundation in maths with write-in Workbooks, and extra questions in Grade C Booster Workbooks to help students get those vital grade Cs.

✓ Smooth progression

Differentiation is provided at every stage of the course. **Colour-coded grades** on the page in Student Books and Homework Books highlight the difficulty level of each question, so students know what level they are working at.

Differentiation is built in to each lesson plan, highlighting what **More able** and **Less able** students could be working on so you can teach a range of abilities in one classroom.

✓ Functional maths

Colourful functional skills and problem-solving pages can be found at the end of each chapter, with accompanying lesson plans in the Teacher's Pack so you can provide practice for students' process skills in stimulating real-life contexts.

Functional maths practice questions are also flagged throughout the Student Books, Workbooks and Homework Books with the FM logo, and the **Functional Skills Standards** are highlighted for every lesson in the Teacher's Packs so you can see at a glance which skills you have covered.

✓ The new Assessment Objectives

In the Student Books, Workbooks and Homework Books, questions that assess understanding (**new Assessment Objective AO2**) are marked AU, and questions that test problem-solving skills (**AO3**) are marked PS, so both you and your students know you are practising the different question types for every maths topic.

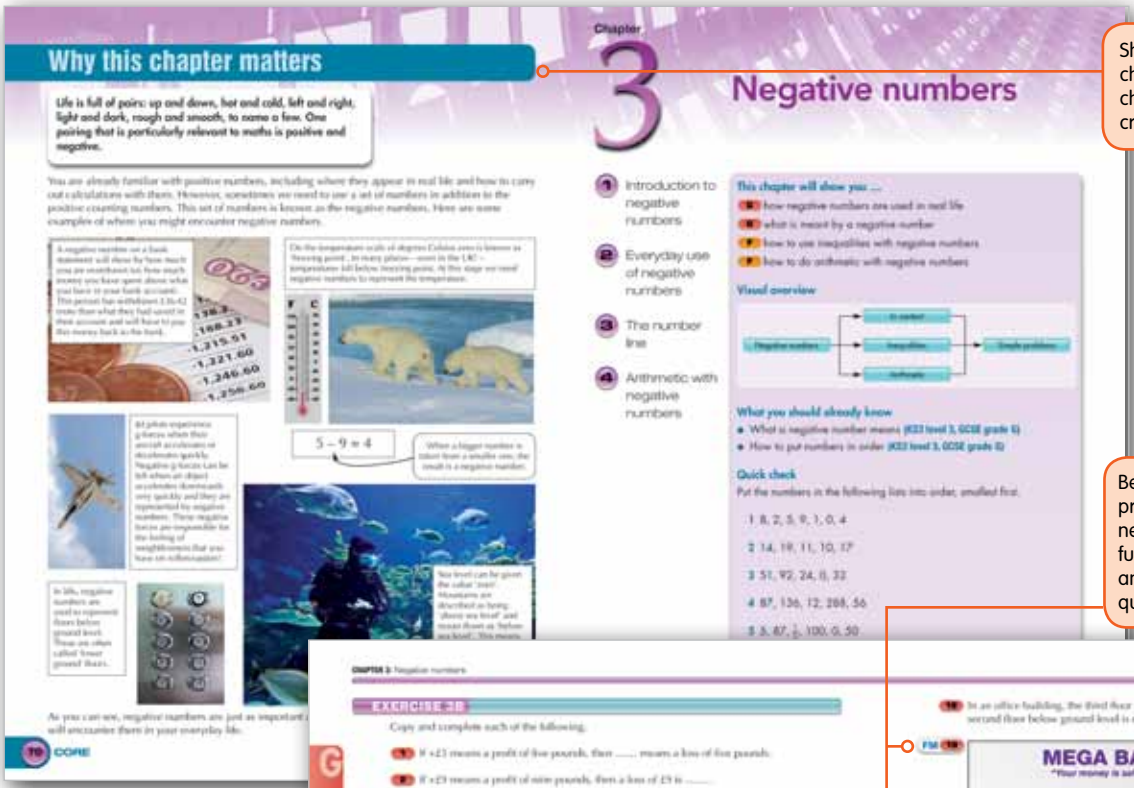
✓ Assessing Pupils' Progress

Students are given the opportunity to assess their own progress and find out what they need to do to improve with **grade boosters** in each chapter in the Student Books and Revision Guides.

The APP focuses covered in each lesson are included in the Teacher's Pack, and you can save valuable administrative time with ready-made tests and reporting tools in our Assessment package.

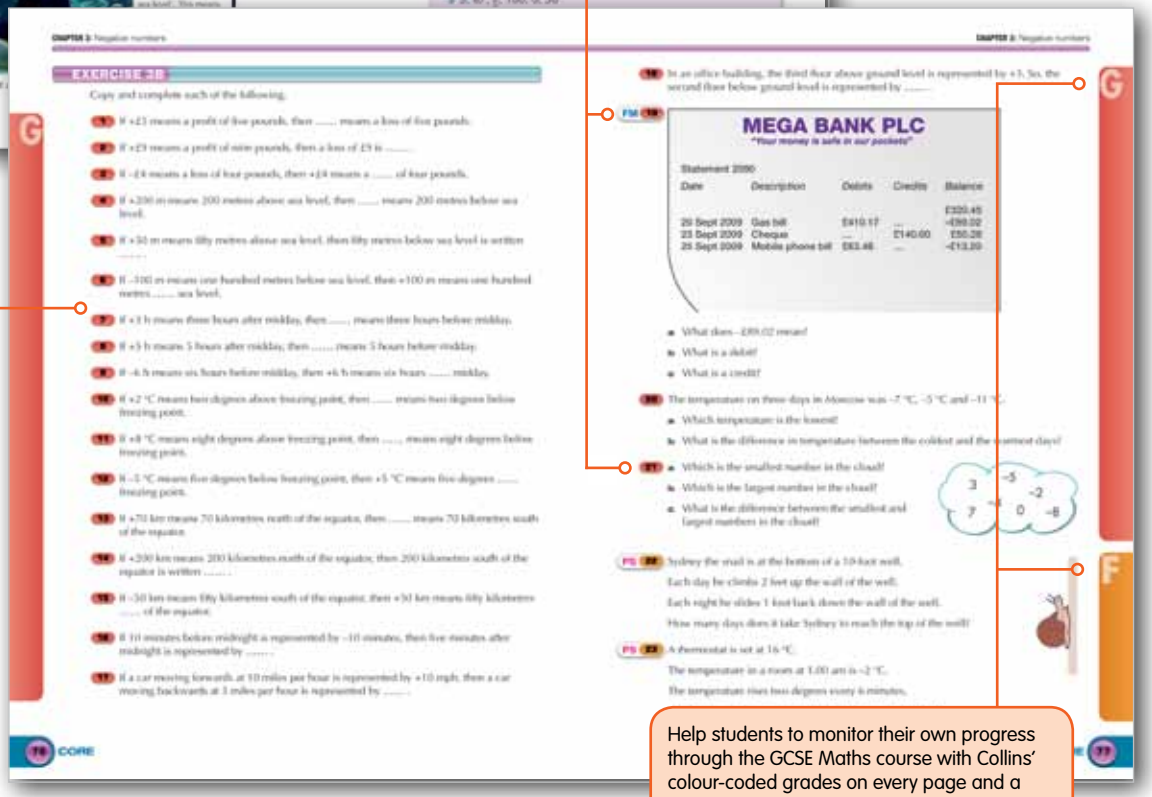
The Components Explained: Student Books

Collins New GCSE Maths Student Books are available for the Foundation and Higher papers. Plenty of functional skills, problem solving and graded maths practice are provided to ensure students are confident answering questions for the new Assessment Objectives (AO1, AO2 and AO3).



Show students exactly why each chapter matters to them with new chapter openers that develop the cross-curricular nature of maths

Be confident that students are practising the key elements of the new curriculum in every lesson with functional skills, problem solving and assessing understanding questions flagged within exercises



From AQA Student Book Foundation 1

Smooth progression in our questions and more of them gives every student the chance to practise, progress and fulfil their potential

You can find sample pages from AQA Student Book Foundation 2 on page 22

Help students to monitor their own progress through the GCSE Maths course with Collins' colour-coded grades on every page and a grade booster at the end of every chapter

How the Books are Structured:

AQA Modular Foundation and Higher:
Book 1: Core, Unit 1, Unit 2
Book 2: Recall, Unit 3

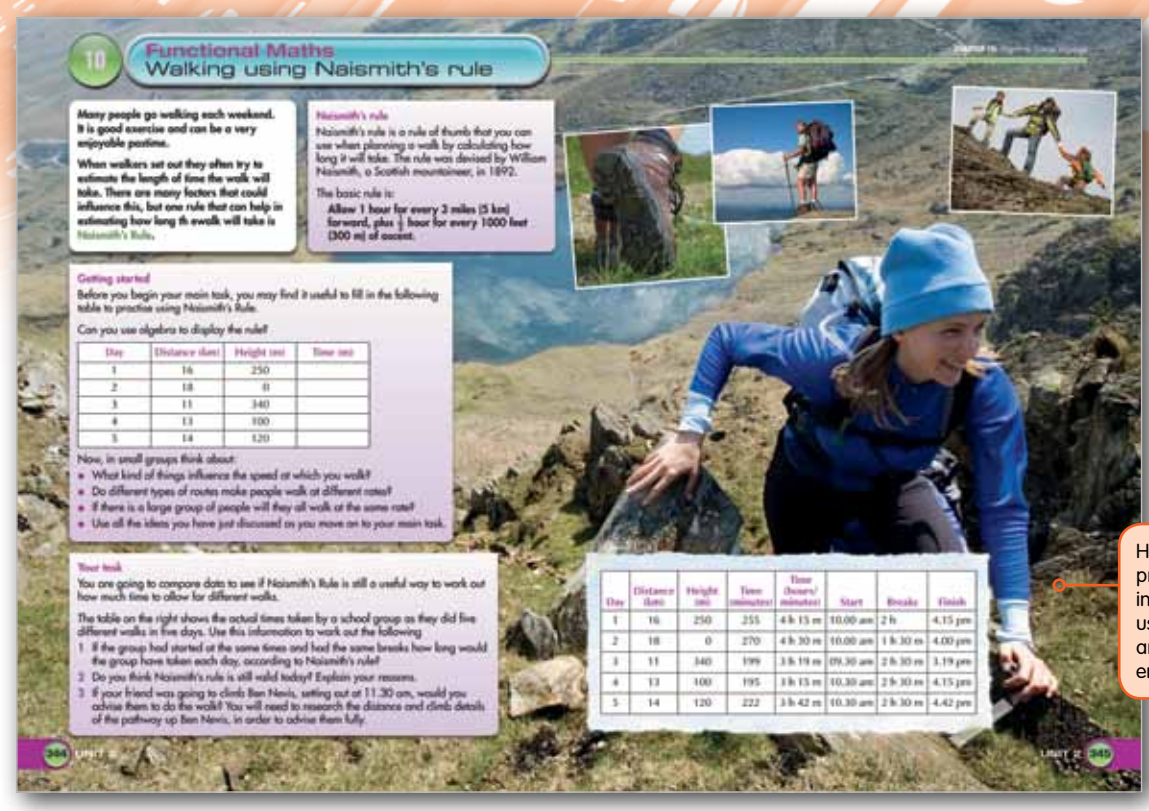
Edexcel Linear Foundation and Higher:
Book 1: for first year of teaching
Book 2: for second year of teaching

Edexcel Modular Foundation:
Book 1: Core, Unit 1
Book 2: Unit 3

Edexcel Modular Higher:
Book 1: Core, Unit 1, Unit 2
Book 2: Unit 3

ALSO AVAILABLE IN THE STUDENT BOOKS:

- Comprehensive exam practice and worked exam questions with examiner notes at the end of every chapter



From AQA Student Book Foundation 1

Help students develop their process skills as they apply maths in stimulating real-life contexts using the colourful functional skills and problem-solving pages at the end of chapters

The Components Explained: Workbooks

Collins New GCSE Maths Workbooks provide support for students to make a smooth transition from KS3 to KS4. Hundreds of practice questions provided in a write-in format make them an ideal resource to give students working at Grades G–E a solid foundation in GCSE Maths. The Grade C Booster Workbook will ensure D/C borderline students get the practice they need to get the C grade on the day.

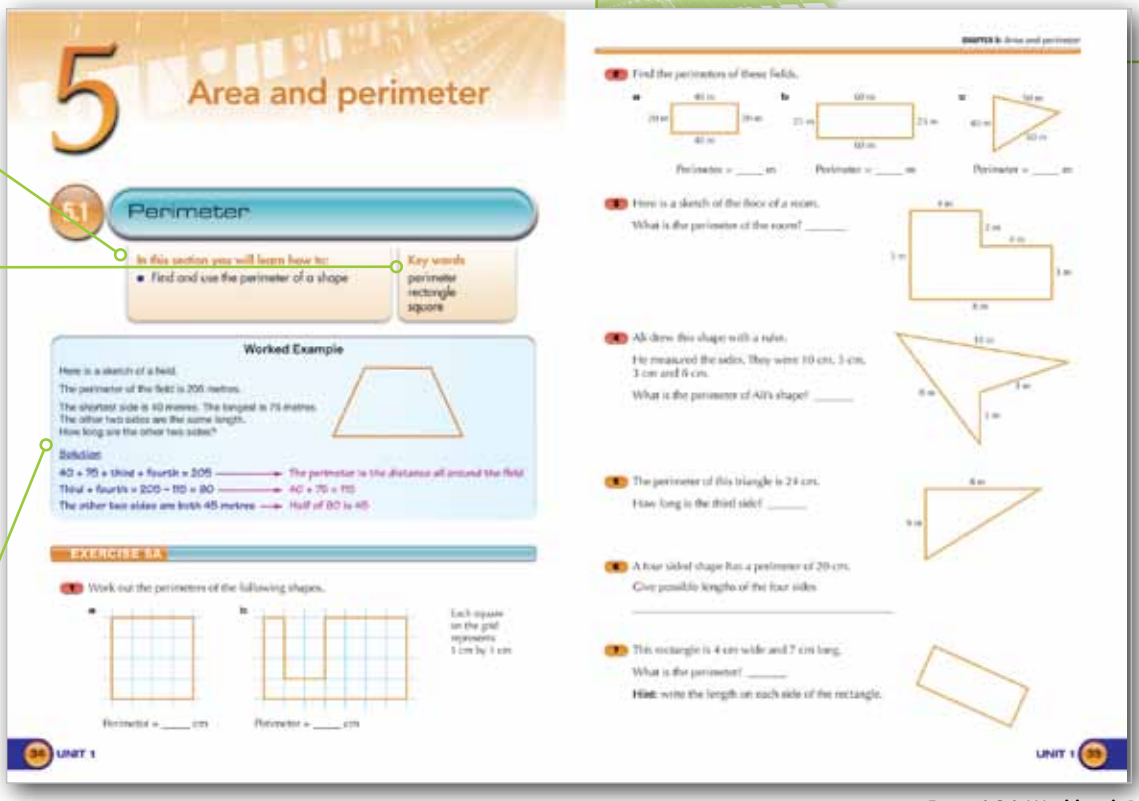
ALSO AVAILABLE IN THE WORKBOOKS:

- Answers at the back in a handy, detachable section to aid self-assessment
- Application sections which cover Functional Skills Level 1 help students understand the application of maths in real-life scenarios
- Exam questions included throughout to prepare students for GCSE exams
- Colourful functional skills and problem-solving pages at the end of each chapter that will help students develop their process skills and allow them to apply maths in stimulating real-life contexts

Check progress with student-friendly learning objectives

Remind students of important vocabulary with key words listed for each chapter

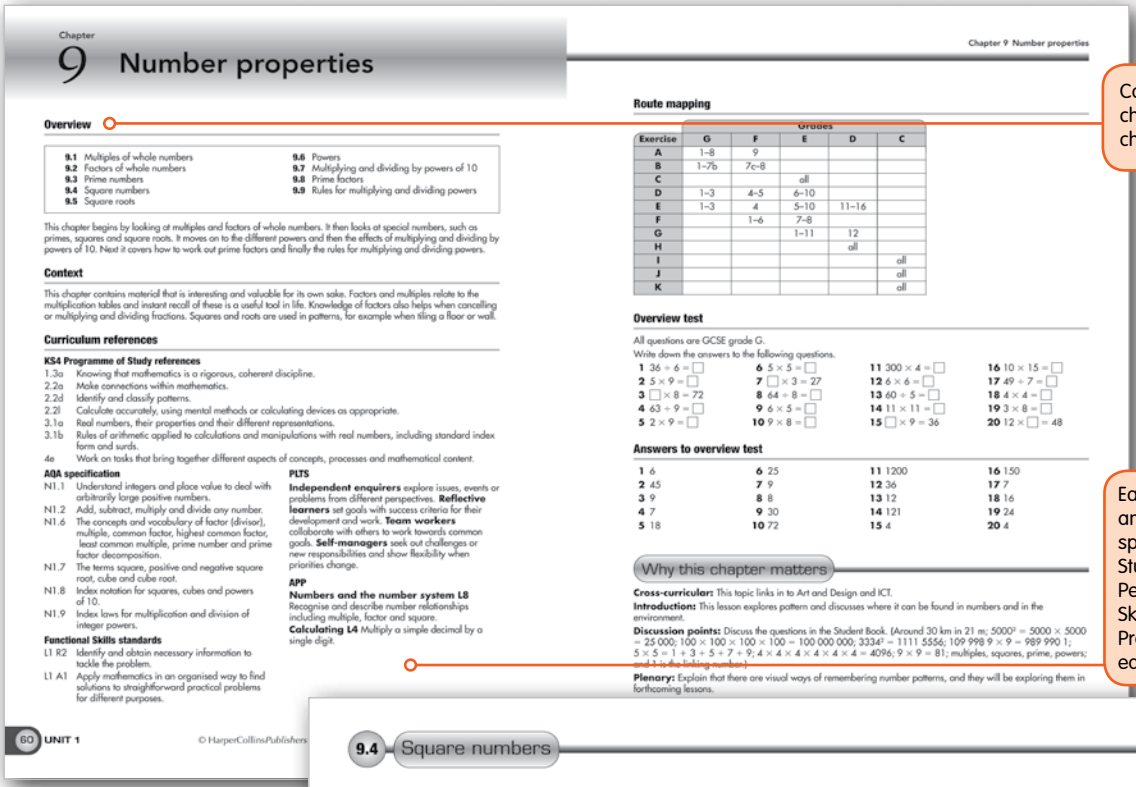
Help students learn how to work through problems step-by-step using the worked examples



From AQA Workbook 1

The Components Explained: Teacher's Packs

Collins New GCSE Maths Foundation and Higher Teacher's Packs contain everything you need to deliver effective lessons with confidence. Differentiated lesson plans, quick access to the Student Book and Homework Book answers, and lesson plans in Word format on the accompanying CD-ROM give you the support and flexibility to adapt lessons to suit all your classes.



Chapter 9 Number properties

Overview

9.1 Multiples of whole numbers
9.2 Factors of whole numbers
9.3 Prime numbers
9.4 Square numbers
9.5 Square roots
9.6 Powers
9.7 Multiplying and dividing by powers of 10
9.8 Prime factors
9.9 Rules for multiplying and dividing powers

This chapter begins by looking at multiples and factors of whole numbers. It then looks at special numbers, such as primes, squares and square roots. It moves on to the different powers and then the effects of multiplying and dividing by powers of 10. Next it covers how to work out prime factors and finally the rules for multiplying and dividing powers.

Context

This chapter contains material that is interesting and valuable for its own sake. Factors and multiples relate to the multiplication tables and instant recall of these is a useful tool in life. Knowledge of factors also helps when cancelling or multiplying and dividing fractions. Squares and roots are used in patterns, for example when tiling a floor or wall.

Curriculum references

KS4 Programme of Study references
1.3a Knowing that mathematics is a rigorous, coherent discipline.
2.2a Make connections within mathematics.
2.2d Identify and classify patterns.
2.2f Calculate accurately, using mental methods or calculating devices as appropriate.
3.1a Real numbers, their properties and their different representations.
3.1b Rules of arithmetic applied to calculations and manipulations with real numbers, including standard index form and surds.
4e Work on tasks that bring together different aspects of concepts, processes and mathematical content.

AQA specification
N1.1 Understand integers and place value to deal with arbitrarily large positive numbers.
N1.2 Add, subtract, multiply and divide any number.
N1.6 The concepts and vocabulary of factor (divisor), multiple, common factor, highest common factor, least common multiple, prime number and prime factor decomposition.
N1.7 The terms square, positive and negative square root, cube and cube root.
N1.8 Index notation for squares, cubes and powers of 10.
N1.9 Index laws for multiplication and division of integer powers.

Functional Skills standards
L1 R2 Identify and obtain necessary information to tackle the problem.
L1 A1 Apply mathematics in an organised way to find solutions to straightforward practical problems for different purposes.

PLTS
Independent enquirers explore issues, events or problems from different perspectives. **Reflective learners** set goals with success criteria for their development and work. **Team workers** collaborate with others to work towards common goals. **Self-managers** seek out challenges or new responsibilities and show flexibility when priorities change.

APP
Numbers and the number system L8 Recognise and describe number relationships including multiple, factor and square.
Calculating L4 Multiply a simple decimal by a single digit.

Route mapping

Exercise	Grades G	F	E	D	C
A	1–8	9			
B	1–7b	7c–8			
C			all		
D	1–3	4–5	6–10		
E	1–3	4	5–10	11–16	
F		1–6	7–8		
G			1–11	12	
H				all	
I					all
J					all
K					all

Overview test

All questions are GCSE grade G.
Write down the answers to the following questions.

1 $36 \div 6 =$ ☐
2 $5 \times 9 =$ ☐
3 ☐ $\times 8 = 72$
4 $63 \div 9 =$ ☐
5 $2 \times 9 =$ ☐
6 $5 \times 5 =$ ☐
7 ☐ $\times 3 = 27$
8 $64 \div 8 =$ ☐
9 $6 \times 5 =$ ☐
10 $9 \times 8 =$ ☐
11 $300 \times 4 =$ ☐
12 $6 \times 6 =$ ☐
13 $60 \div 5 =$ ☐
14 $11 \times 11 =$ ☐
15 ☐ $\times 9 = 36$
16 $10 \times 15 =$ ☐
17 $49 \div 7 =$ ☐
18 $4 \times 4 =$ ☐
19 $3 \times 8 =$ ☐
20 $12 \times$ ☐ $= 48$

Answers to overview test

1 6
2 45
3 9
4 7
5 18
6 25
7 9
8 8
9 30
10 72
11 1200
12 36
13 12
14 121
15 4
16 150
17 7
18 16
19 24
20 4

Why this chapter matters

Cross-curricular: This topic links in to Art and Design and ICT.
Introduction: This lesson explores pattern and discusses where it can be found in numbers and in the environment.
Discussion points: Discuss the questions in the Student Book. (Around 30 km in 21 m; $5000^2 = 5000 \times 5000 = 25\,000\,000$; $100 \times 100 \times 100 \times 100 = 100\,000\,000$; $3334^2 - 1111.5556$; $109\,998 \times 9 \times 9 = 989\,990\,1$; $5 \times 5 = 1 + 3 + 5 + 7 + 9$; $4 \times 4 \times 4 \times 4 \times 4 \times 4 = 4096$; $9 \times 9 = 81$; multiples, squares, prime, powers; and it is fun to learn maths.)
Plenary: Explain that there are visual ways of remembering number patterns, and they will be exploring them in forthcoming lessons.

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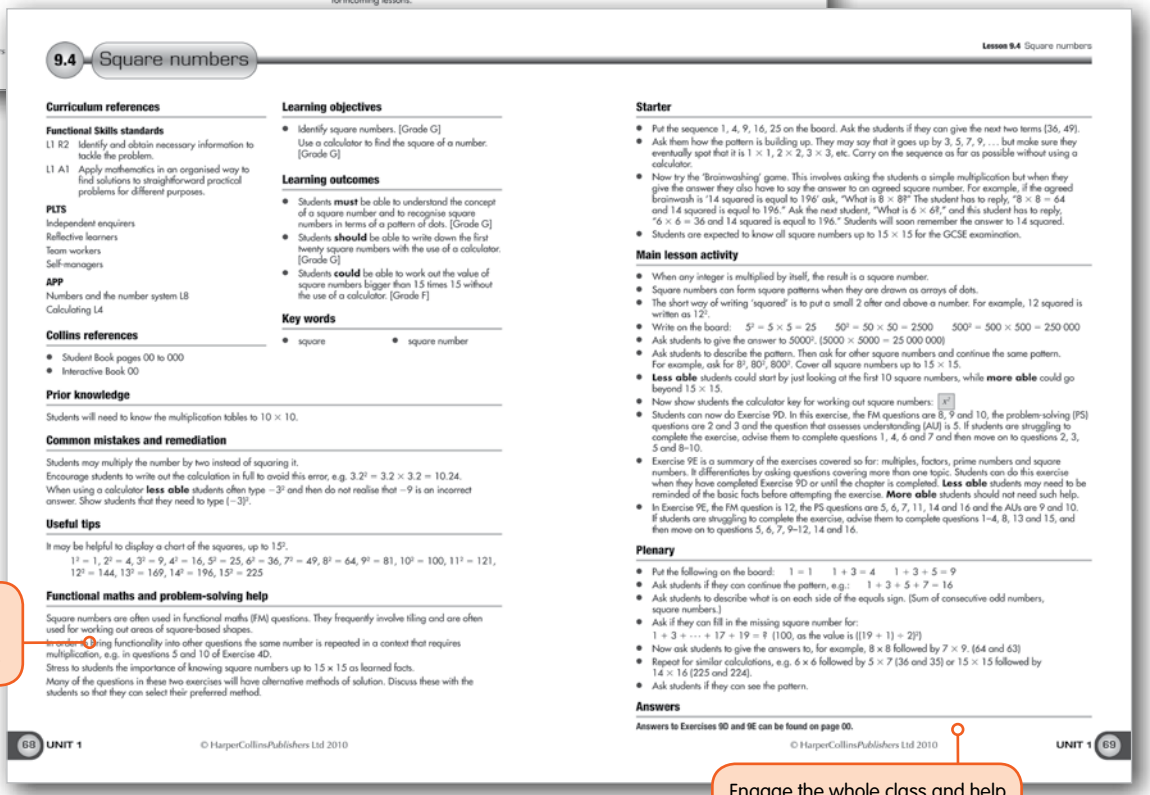
Capture the essence of chapters at a glance with chapter overviews

Easily access learning objectives and references to the exam board specifications, KS4 Programme of Study, Functional Skills Standards, Personal Learning and Thinking Skills (PLTS) and Assessing Pupils' Progress (APP) opportunities for each chapter

From AQA Teacher's Pack Foundation 1



Lesson 9.4 Square numbers

9.4 Square numbers

Curriculum references

Functional Skills standards
L1 R2 Identify and obtain necessary information to tackle the problem.
L1 A1 Apply mathematics in an organised way to find solutions to straightforward practical problems for different purposes.

PLTS
Independent enquirers
Reflective learners
Team workers
Self-managers

APP
Numbers and the number system L8
Calculating L4

Collins references
- Student Book pages 00 to 000
- Interactive Book 00

Prior knowledge
Students will need to know the multiplication tables to 10 × 10.

Common mistakes and remediation
Students may multiply the number by two instead of squaring it.
Encourage students to write out the calculation in full to avoid this error, e.g. $3.2^2 = 3.2 \times 3.2 = 10.24$.
When using a calculator **less able** students often type -3^2 and then do not realise that -9 is an incorrect answer. Show students that they need to type $(-3)^2$.

Useful tips
It may be helpful to display a chart of the squares, up to 15^2.
$1^2 = 1$, $2^2 = 4$, $3^2 = 9$, $4^2 = 16$, $5^2 = 25$, $6^2 = 36$, $7^2 = 49$, $8^2 = 64$, $9^2 = 81$, $10^2 = 100$, $11^2 = 121$, $12^2 = 144$, $13^2 = 169$, $14^2 = 196$, $15^2 = 225$

Functional maths and problem-solving help
Square numbers are often used in functional maths (FM) questions. They frequently involve tiling and are often used for working out areas of square-based shapes.
In order to bring functionality into other questions the same number is repeated in a context that requires multiplication, e.g. in questions 5 and 10 of Exercise 4D.
Stress to students the importance of knowing square numbers up to 15 × 15 as learned facts.
Many of the questions in these two exercises will have alternative methods of solution. Discuss these with the students so that they can select their preferred method.

Learning objectives
- Identify square numbers. [Grade G]
  Use a calculator to find the square of a number. [Grade G]

Learning outcomes
- Students **must** be able to understand the concept of a square number and to recognise square numbers in terms of a pattern of dots. [Grade G]
- Students **should** be able to write down the first twenty square numbers with the use of a calculator. [Grade G]
- Students **could** be able to work out the value of square numbers bigger than 15 times 15 without the use of a calculator. [Grade F]

Key words
- square
- square number

Starter
- Put the sequence 1, 4, 9, 16, 25 on the board. Ask the students if they can give the next two terms (36, 49).
- Ask them how the pattern is building up. They may say that it goes up by 3, 5, 7, 9, … but make sure they eventually spot that it is 1×1, 2×2, 3×3, etc. Carry on the sequence as far as possible without using a calculator.
- Now try the 'Brainwashing' game. This involves asking the students a simple multiplication but when they give the answer they also have to say the answer to an agreed square number. For example, if the agreed brainwash is '14 squared is equal to 196' ask, "What is 8×8?" The student has to reply, "$8 \times 8 = 64$ and 14 squared is equal to 196." Ask the next student, "What is 6×6?," and this student has to reply, "$6 \times 6 = 36$ and 14 squared is equal to 196." Students will soon remember the answer to 14 squared.
- Students are expected to know all square numbers up to 15 × 15 for the GCSE examination.

Main lesson activity
- When any integer is multiplied by itself, the result is a square number.
- Square numbers can form square patterns when they are drawn as arrays of dots.
- The short way of writing 'squared' is to put a small 2 after and above a number. For example, 12 squared is written as 12^2.
- Write on the board: $5^2 = 5 \times 5 = 25$ $50^2 = 50 \times 50 = 2500$ $500^2 = 500 \times 500 = 250\,000$
- Ask students to give the answer to 5000^2. ($5000 \times 5000 = 25\,000\,000$)
- Ask students to describe the pattern. Then ask for other square numbers and continue the same pattern. For example, ask for 8^2, 80^2, 800^2. Cover all square numbers up to 15×15.
- **Less able** students could start by just looking at the first 10 square numbers, while **more able** could go beyond 15×15.
- Now show students the calculator key for working out square numbers: x^2
- Students can now do Exercise 9D. In this exercise, the FM questions are 8, 9 and 10, the problem-solving (PS) questions are 2 and 3 and the question that assesses understanding (AU) is 5. If students are struggling to complete the exercise, advise them to complete questions 1, 4, 6 and 7 and then move on to questions 2, 3, 5 and 8–10.
- Exercise 9E is a summary of the exercises covered so far: multiples, factors, prime numbers and square numbers. It differentiates by asking questions covering more than one topic. Students can do this exercise when they have completed Exercise 9D or until the chapter is completed. **Less able** students may need to be reminded of the basic facts before attempting the exercise. **More able** students should not need such help.
- In Exercise 9E, the FM question is 12, the PS questions are 5, 6, 7, 11, 14 and 16 and the AUs are 9 and 10. If students are struggling to complete the exercise, advise them to complete questions 1–4, 8, 13 and 15, and then move on to questions 5, 6, 7, 9–12, 14 and 16.

Plenary
- Put the following on the board: $1 = 1$ $1 + 3 = 4$ $1 + 3 + 5 = 9$
- Ask students if they can continue the pattern, e.g.: $1 + 3 + 5 + 7 = 16$
- Ask students to describe what is on each side of the equals sign. (Sum of consecutive odd numbers, square numbers.)
- Ask if they can fill in the missing square number for:
  $1 + 3 + \ldots + 17 + 19 = ?$ (100, as the value is $((19 + 1) \div 2)^2$)
- Now ask students to give the answers to, for example, 8×8 followed by 7×9. (64 and 63)
- Repeat for similar calculations, e.g. 6×6 followed by 5×7 (36 and 35) or 15×15 followed by 14×16 (225 and 224).
- Ask students if they can see the pattern.

Answers
Answers to Exercises 9D and 9E can be found on page 00.

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Link maths concepts and help students to access functional and problem-solving questions

Engage the whole class and help them consolidate new concepts with tripartite lesson structures

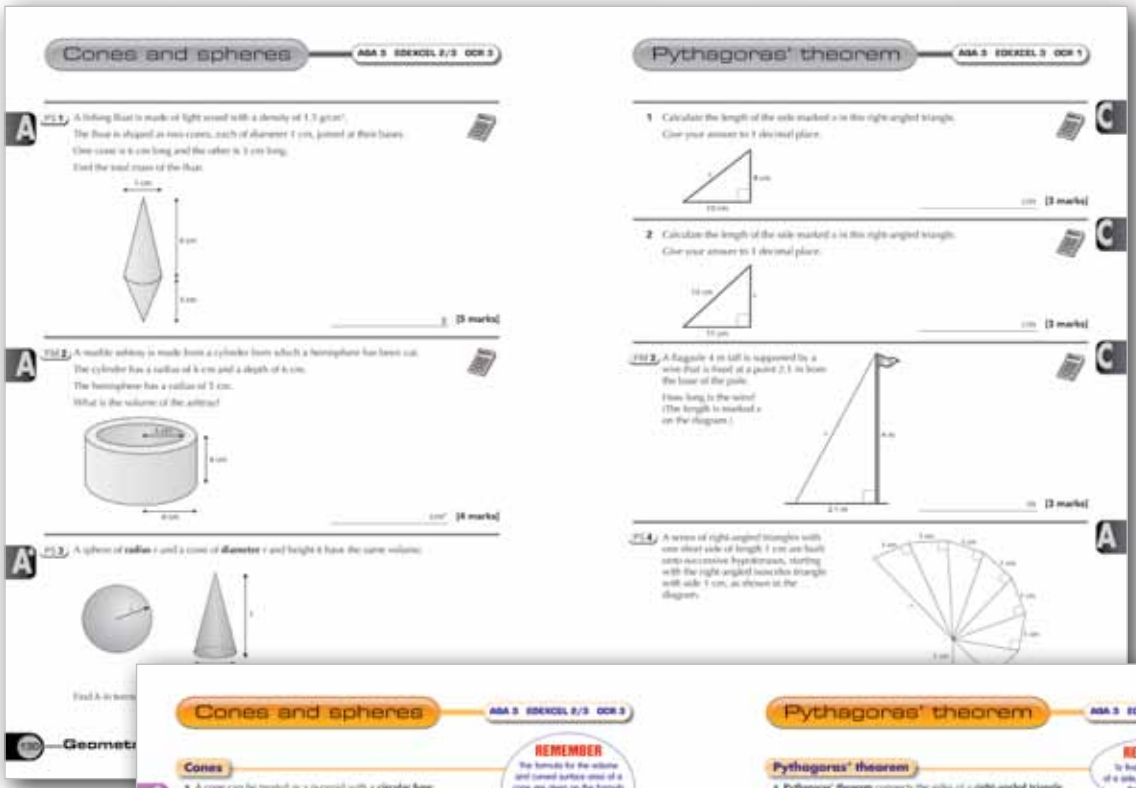
ALSO AVAILABLE IN THE TEACHER'S PACKS:

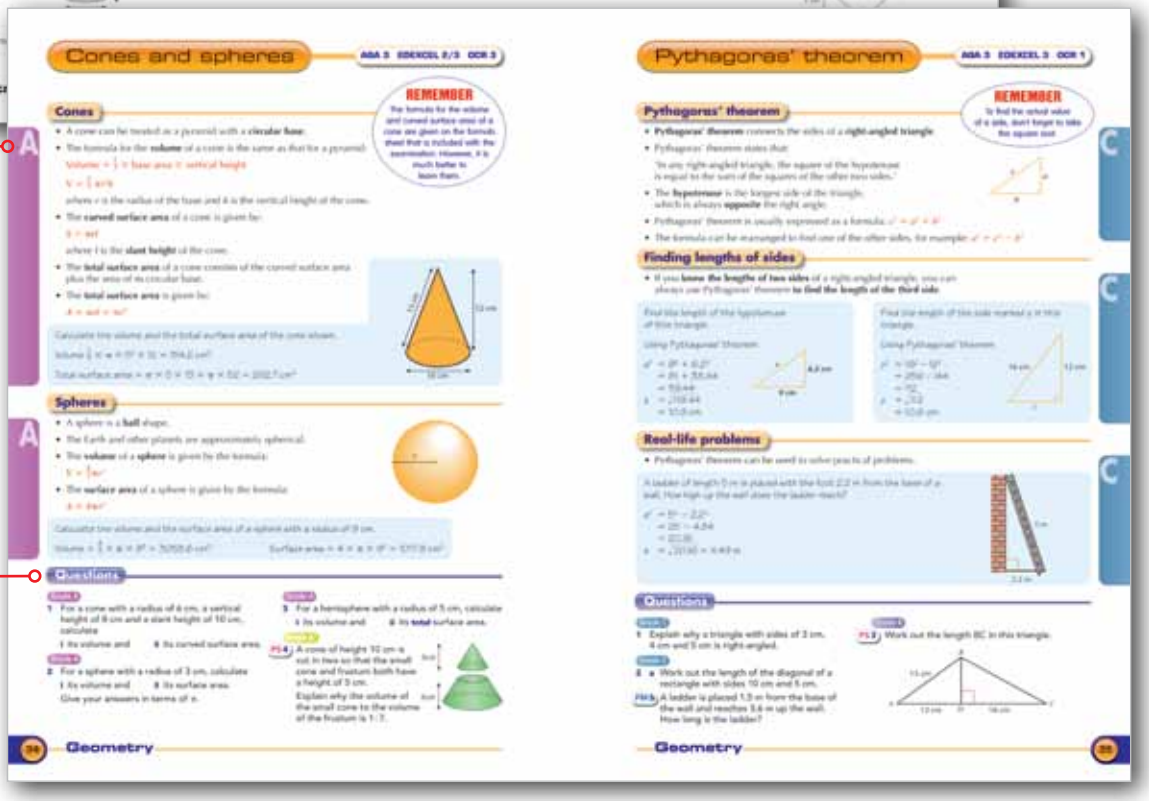
- Quick access to answers to questions in the corresponding Student Book and Homework Book. (Please note: answers to Homework Book Foundation 1 will be available at **www.collinseducation.com/newgcsemathsanswers**)
- Ready-made Schemes of Work for 2 and 3 years
- Lesson plans in Word format on the CD-ROM

This guide contains full size samples of 'Negative numbers', including four lessons for you to use with Student Book Foundation 1. Turn to page 12...

The Components Explained: Revision Guides

Prepare your students for the exams with these all-in-one revision guide and exam-practice workbooks. Written by an experienced examiner, they show how each student can follow their level, test their knowledge, check their answers and improve their maths grade.





Students know what level they are working towards with colour-coded graded content

Plenty of practice, including problem solving and functional skills, with lots of tried and tested maths questions and exam practice, helps students consolidate their knowledge and gain confidence

From Collins Revision New GCSE Maths Higher: Edexcel, AQA and OCR

You can find full size examples from the Foundation and Higher Revision Guides on pages 30-37 in this guide.

ALSO AVAILABLE IN THE REVISION GUIDES:

- Practical guidance, exam technique tips and grade boosters help students get the best possible grade
- Answers to the Workbook questions in a detachable section at the back of the book

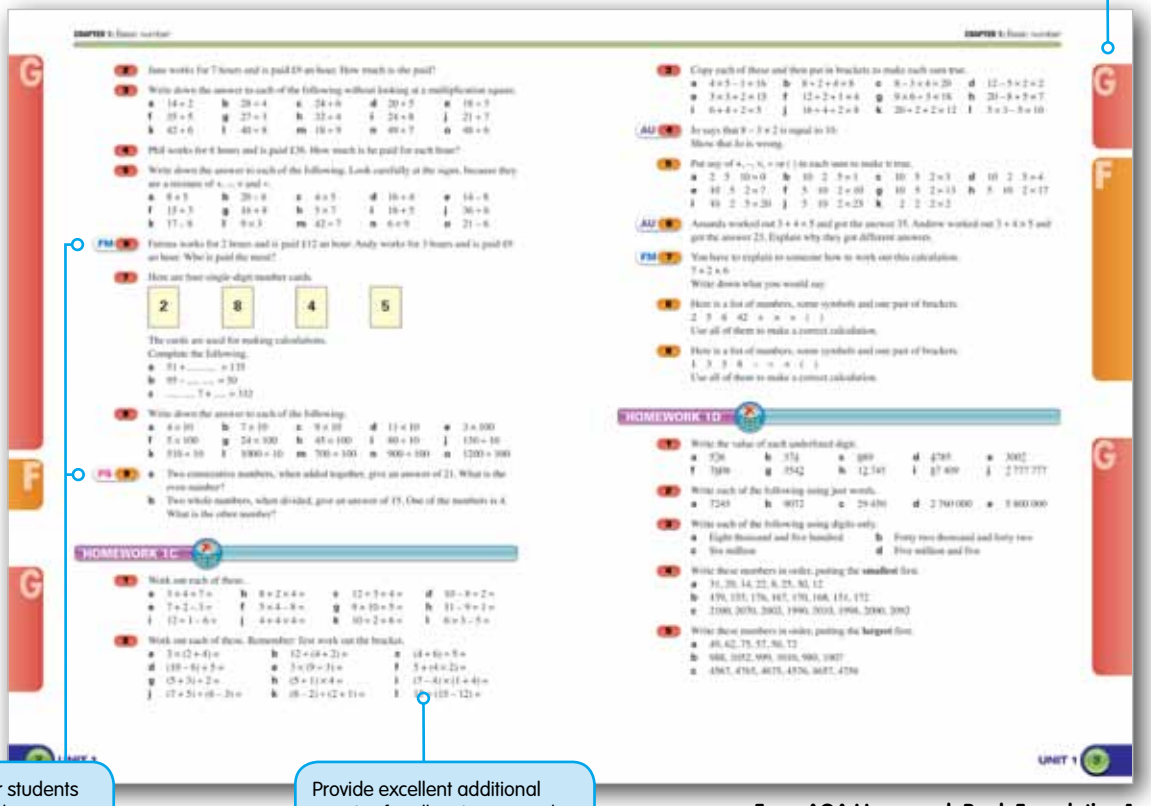
The Components Explained: Homework Books

Collins New GCSE Maths Homework Books are excellent companions to the Student Books. Following the familiar structure and layout of the Student Book, the Homework Book provides extensive practice of all the elements of the new curriculum. Also available on a VLE compatible CD-ROM.

ALSO AVAILABLE IN THE HOMEWORK BOOKS:

- Develop students' functional maths and problem-solving skills with open-ended investigative tasks at the end of every chapter
- Give students easy reference to the clear explanations and examples in their textbooks with a free CD-ROM of the Student Book inside

Enable students to assess their own progress through each chapter with familiar colour-coded grades in every exercise



Provide continuity for your students with functional skills, problem solving and assessing understanding questions flagged in the same style as the Student Books

Provide excellent additional practice for all topics covered in the Student Book with brand new questions not found in the Student Book

From AQA Homework Book Foundation 1

The Components Explained: Assessment

Assess and track students' progress with *Collins New GCSE Maths* flexible online and paper assessment.

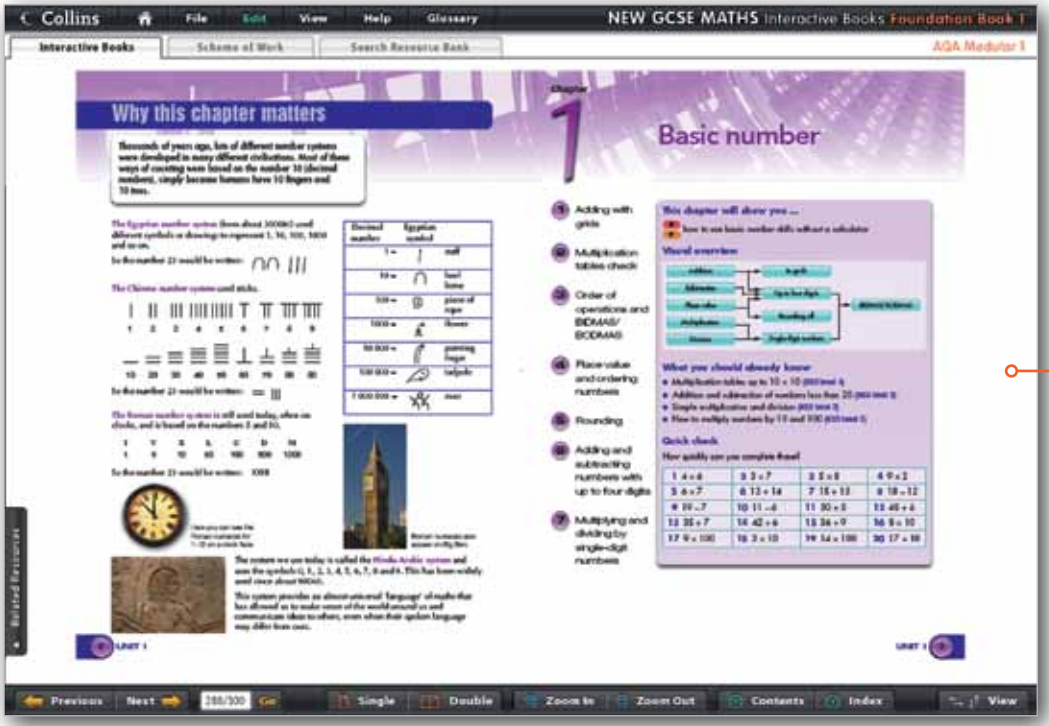
- Access paper tests to download and keep and online auto-marking tests that are fully integrated into the *Collins New GCSE Maths* scheme and matched to the new curriculum
- Pinpoint individual students' strengths, areas for improvement and next steps with detailed student/parent and teacher reports
- Chart students' progress over the whole GCSE course to ensure that they hit their target grade
- View performance at individual student, class or year group level to highlight strengths and areas to develop
- Save valuable admin and preparation time with ready-made tests and valuable reporting tools
- Easily import and export data to school MIS (e.g. SIMs) or to Excel, saving you time when setting up class lists or saving performance information

TESTS AVAILABLE:

- Paper tests (per book): initial test, end of chapter tests, half term tests, end of year test, end of unit tests
- Electronic tests (per book): half term tests, end of year test

The Components Explained: Interactive Books

These easy-to-use interactive whiteboard resources are packed full of real-life examples, functional skills, problem solving and an interactive Scheme of Work fully integrated into the *Collins New GCSE Maths* scheme. With classroom-friendly software and resources which have been developed, written and tested by teachers, you'll be able to integrate ICT into all your lessons with ease.

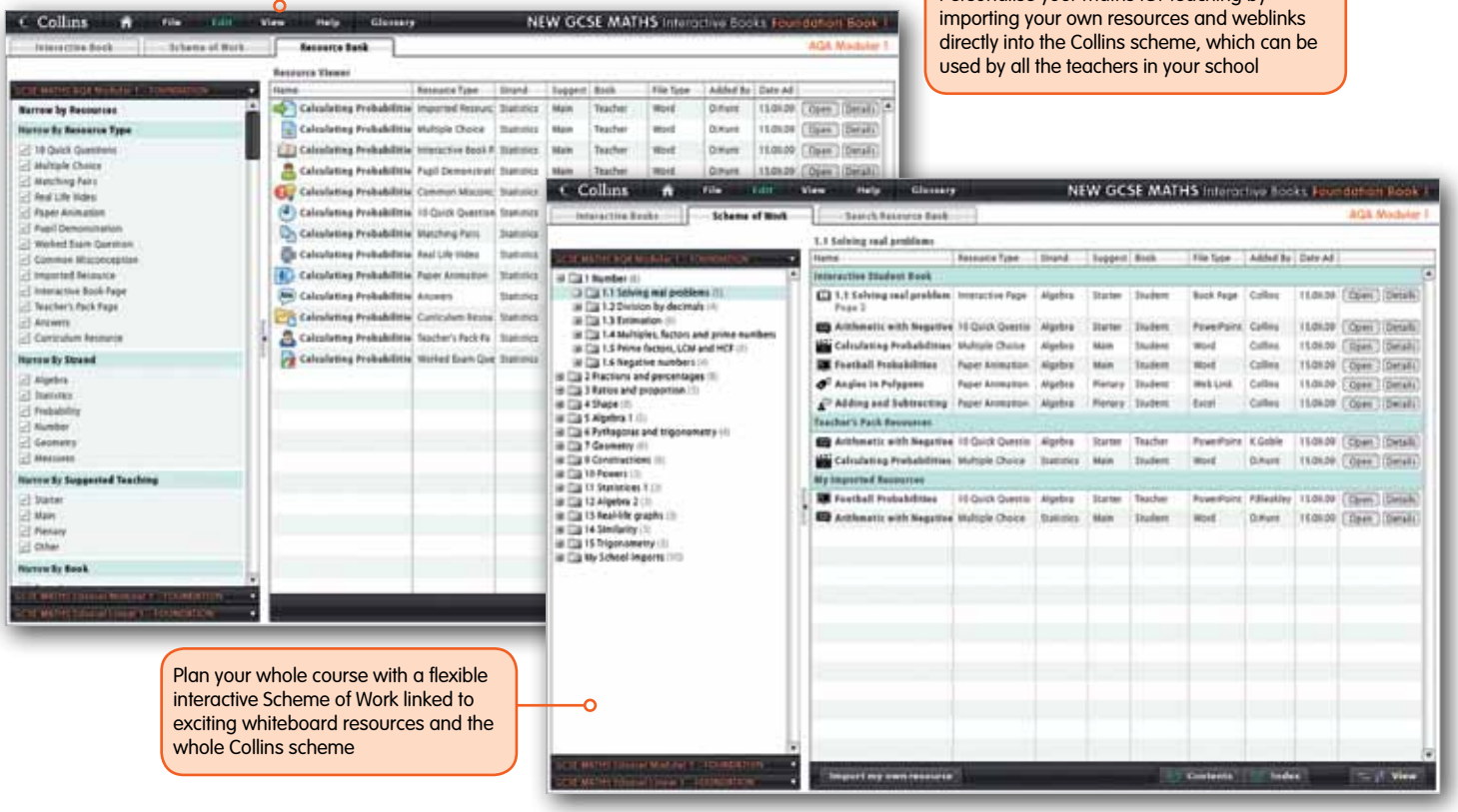


For each lesson:

- Keyword definitions
- Interactive resources that cover the GCSE Maths subject criteria and/or essential core maths:
  - Paper animations
  - Real life videos
  - Worked exam questions
  - Common misconceptions
  - 10 quick questions
  - Multiple choice questions
  - Matching pairs

From Interactive Book Foundation 1

Personalise your maths ICT teaching by importing your own resources and weblinks directly into the Collins scheme, which can be used by all the teachers in your school



Plan your whole course with a flexible interactive Scheme of Work linked to exciting whiteboard resources and the whole Collins scheme

You can find out more and try out seven of the interactive resources for yourself with the Demo Disk inside this Evaluation Pack!