DISCOVERING MATHEMATICS

The Mastery Course for Key Stage 3

Bringing together an experienced team of UK reviewers and mastery experts, alongside the original Singaporean author team, this is the UK adaptation of the leading Singapore course

Discover more:
www.oxfordsecondary.co.uk/discoveringmathematics
NEW

KS3 maths mastery from Oxford

Discovering Mathematics is the exciting new maths course from Oxford that brings the renowned Singaporean secondary series to the English Key Stage 3 National Curriculum.

- Adapted by the original Singaporean author team in conjunction with a large team of UK mastery experts and teachers
- Includes new material written to provide comprehensive support for three tiers (Foundation, Middle and Higher) across all three year groups
- Draws upon a proven approach to raising maths achievement, built around the ‘growth mindset’ that every child can succeed
- Enables students to explore new concepts through concrete, pictorial and abstract representation, supporting progression and depth of understanding
- Applies new 9–1 GCSE grades to every question
- Supported by digital resources through the popular Kerboodle platform
- Optional professional development training is available to provide full support in implementing the course.

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This chart outlines the course structure for Discovering Mathematics

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Graded Question Bank 2
Graded Question Bank 3
Kerboodle Books
What’s so special about the mastery approach?

In the top performing Asian nations, considerable emphasis is placed on teachers’ professional development and on using high quality resources. In Singapore, for example, all secondary schools adopt a textbook series and over 60% of them have chosen Discovering Mathematics.

The mastery approach is broadly characterised by:
- the use of concrete objects and pictures, alongside abstract representation, to explain concepts
- a focus on problem-solving as the ultimate objective of a maths education
- a commitment to all students mastering a concept before moving on — underpinned by the firm belief that all students can succeed
- Precise use of mathematical language at all times and in all answers
- Consistent use of models and concrete objects, in particular bar models, place-value discs, and algebra discs.

Introducing the team

The UK adaptation of Discovering Mathematics has been developed by the original Singaporean author team, in conjunction with a large team of UK and Singaporean teacher reviewers and mastery practitioners. These include:

**Author Victor Chow** has over 16 years’ experience of teaching in secondary schools and technical institutes. Passionate about textbooks, he is the author of a number of successful mathematics and statistics series for students in Years 7 to 12. Writing under the name Chow Wai Keung, he is the author of the original Discovering Mathematics series, which has been the leading course in Singapore for the last 10 years.

**Singapore Consultant Berinderjeet Kaur** is Professor of Mathematics Education at the National Institute of Education in Singapore. She is the founding chairperson of the Singaporean Mathematics Teachers’ Conference series and a member of the Mathematics Expert Group to PISA 2015. She is passionate about the development of mathematics teachers.

Professor Kaur has been a key consultant and reviewer for the UK adaptation of Discovering Mathematics and its Professional Development programme.

See page 15 for more details on the Discovering Mathematics Professional Development Programme

**UK Consultant Robert Wilne** has over 20 years’ experience teaching both primary and secondary maths, most recently teaching at the Harris Federation, where he was focusing on ‘joining up’ learning and teaching of maths from Y6 to Y8. He previously led the England-Shanghai Teaching for Mastery teacher exchange and research project at the National Centre for Excellence in the Teaching of Mathematics (of which he was Director for Secondary).

**Star Publishing Pte Ltd**

Discovering Mathematics is created in partnership with Star Publishing, a well-known Singapore-based educational publisher led by Steve Seow, whose experience and expertise in educational publishing has been widely respected since the 1970s.

**Series Guide for Teachers**

Berinderjeet Kaur, Robert Wilne and Naomi Norman

This easy-to-read guide offers an overview of the mastery approach and how it can be implemented in your school.
- Jargon-free explanations that uncover the secrets of Singapore’s extraordinary maths success
- Introduces and explains the key principles of teaching for mastery
- Illustrated examples and case studies offer practical tips on how to successfully introduce the approach into your maths department
- Key features of the Discovering Mathematics series are explained, with advice on how to make the best use of all components in the series, including the Kerboodle digital resources.

Discovering Mathematics Series Guide for Teachers
978 019 842229 9
The Discovering Mathematics Student Books pioneered the discovery approach to learning. Core learning is interspersed with class activities, which encourage group learning and discussion, and short Try It! questions to ensure understanding every step of the way. Concrete and pictorial activities help to build a truly rich, deep understanding of the maths. Above all, the whole class is encouraged to progress together. Problem-solving questions are clearly flagged and provide the final support on the road to mastery.
Chapter 1 Positive Integers

9

400 300 200 100 00 100 200 300 400

500

Student Books

Vertical distance between them

sea level.

Find the factors of the answer in

(b)

(a)

walks 42 m due west.

(b)

(c)

x

the equation 3

= 7

70

35

× 20 = 10

14

and 140.

7

= 7

= 7

714

rapid intervention

also give instant

understanding.

4

7

x

? = + ?

6

10

6

10

24

3

− 6

2477

[72 − 4 × 3433]

The time taken to fly from London to Paris is

6.

A theatre has 25 rows of seats with

7 cm? Explain your answer.

537

16

+ 161

− 18

÷ 256

25

− 18

÷ 161

16

× 74

− 18

÷ 161

16

× 74

− 18

÷ 161

16

÷ 6792, to the nearest 10

of accuracy.

38

Write in Your Journal

If 28 146 spectators are male, what is the

12.

In 2011, the M74 motorway in Glasgow was

15.

Three boys form a band and sell their own

15.

10.

There are 628 cm³ of solution in a beaker.

12.

A population pyramid shows the age and sex of a population. The diagram shows the

10.

B. London Tower Bridge

Tower Bridge is a bridge crossing the River Thames in London. It was built between

1.

Assume all Year 7 students are 11 years old. Estimate the total number of Year 7

2.

Three tiers available for all three year groups

Foundation Tier Student Books provide extra support and practice

Higher Tier Student Books include more challenging questions to deepen learning

Easily accessible Student Book answers:

We know it's important for you and your students to have easy access to the answers for the Student Book questions, so we have provided three options for you.

1. Short answers in the back of the Student Books

2. Fully worked solutions in the Teacher Guide, with GCSE 9-1 grades indicated

3. Try It! videos as hotspots in the digital book on Kerboodle show a narrated stepped reveal of key examples. These support students to develop reasoning and to use precise mathematical language

Two problem-solving sections are included in every Student Book:

- Problem-Solving and Heuristics teaches students how to plan and approach a problem-solving task
- Problems in Real-World Contexts at the end of each Student Book gives students the chance to apply their learning to real-life examples

Integrated Examples and Review Exercises occur after each group of chapters in the Student Books. Step-by-step solutions show students how to work through a given example. Short Try It! questions build on that learning so students feel confident to attempt subsequent Review Exercises.
Problem solving is flagged throughout to help students develop their skills.

Workbook answers provided in two easily accessible formats
1. Short answers FREE for customers to download ONLINE (password-protected)
2. Fully worked solutions with GCSE grades on Kerboodle (teacher-only access)

Graded Question Banks
These supplementary practice resources are for use alongside the Student Books and Workbooks. There is one book for each year, with questions following the series approach of three levels, with clear identification of problem-solving and cross-curricular questions.

Graded Question Bank answers provided in two easily-accessible formats:
1. Short answers at the back of the book
2. Fully worked solutions on Kerboodle (teacher-only access)

Manipulatives
Concrete manipulatives to help students master algebra are available in class-sets colour-coded to match the Student Books.

Discovering Mathematics
Manipulatives Pack: Algebra Discs
- To support activities in Higher, Middle and Foundation Tiers
- For operations using positive and negative integers
- For understanding of algebraic expressions and operations
- Class set contains 20 Student Sets for sharing in class (1,600 discs in total)
- Each Student Set includes 80 two-sided positive/negative discs of 5 different colours
- All disks are double-sided
  - $x^2$, $y^2$, $xy$, $-x^2$, $-y^2$, $-xy$

Track Your Progress Checklists at start of each Workbook enable students to assess their learning and know when to ask for help.
Online resources

Discovering Mathematics Kerboodle provides complete support for digital practice and assessment. It includes:

- **Digital editions of all nine Student Books** for front-of-class use, with hotspots on the page linking directly to videos, assessments, and further support on MyMaths
- **Full suite of printable assessments** offer progression from basic fluency, to application of concepts, to problem-solving
- **Auto-marked tests** for each chapter give you and your students instant feedback, allowing for rapid intervention
- **Printable self-assessment checklist** for students to track their own progression
- **Fully worked solutions** to all questions in the Workbooks, Graded Question Banks and printable assessments show students how to reason and present their answers using precise mathematical language
- **Unique worked example videos for key Try It! questions** facilitate working through solutions in the classroom
- **Digital edition of the Series Guide for Teachers** offers an easy-to-read overview of how Discovering Mathematics works and how to embed it successfully in your school

Also available

Discovering Mathematics Kerboodle Books provides online student access to all nine Student Books for use in school or at home.

Our digital service commitment to our customers includes:

- Access to a dedicated team of regional Educational Consultants and Digital Specialists
- Free in-school digital training and helpdesk support
- Access to our support website, YouTube training videos and webinars

Request your free Kerboodle trial today! See back page for details of how to contact us.

INTRODUCTION TO ALGEBRA

Most cars and lorries carry a spare tyre. Cars have 4 working tyres + 1 spare tyre, so 5 tyres in total. Some lorries have 8 working tyres as well as the spare tyre. All these vehicles can be said to carry ‘N + 1 tyres’. What does N stand for in this expression?

LET’S LEARN TO

- Use letters to represent integers
- Interpret simple algebraic notations
- Substitute integers into simple expressions and formulae
- Write simple expressions and formulae
- Simplify expressions by collecting like terms
- Add and subtract linear expressions
- Auto-marked tests for every chapter give you and your students instant feedback, allowing for rapid intervention and support
- Links to corresponding MyMaths lessons for each chapter section, providing further practice and support for your students

Chapter-opening videos introduce every topic in a real-life context

Worked example videos of key Try It! questions provide a line-by-line walk-through of questions with model answers
Teacher Guides

The Teacher Guides are an essential course companion, written for both specialist and non-specialist teachers. Suggested Schemes of Work support departmental planning, and Notes on Teaching provide advice on how to approach each lesson. Fully worked solutions for all Student Book questions support the development of reasoning skills, with an emphasis on using precise mathematical language.

Professional Development

We offer a range of optional Professional Development training to help you implement the mastery approach in your school. Our courses offer practical, expert support to help teachers at all stages of their careers use the mastery approach to transform the teaching and learning of mathematics in their schools.

To find out more, please contact our friendly PD team for a no-obligation chat about your needs:

e-mail: events@oup.com

Call: 01865 353070

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<th>Total time</th>
<th>Overview</th>
<th>Who is the PD aimed at?</th>
<th>InSET or Central Training</th>
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Order your Evaluation Pack today!

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* Discovering Mathematics Evaluation Pack
978 019 842671 4
Available on 30 day free evaluation.
For our terms and conditions visit our website.

Publishing timeline*

- **January 2018**: Evaluation Pack available, containing Year 7 Student Book 1B and Workbook 1B
- **January 2018**: Kerboodle ‘Early Access’ resources available for evaluation
- **2018**: All Year 7 Student Books, Workbooks and Teacher Guides available
- **Spring 2019**: Year 8 (2B) Student Book, Workbook and Teacher Guide
- **2019**: All remaining Year 8 resources
- **2020**: All remaining Year 9 resources

* Publication dates may be subject to change

**Star Publishing Pte Ltd**

* Discovering Mathematics is created in partnership with Star Publishing, a well-known Singapore-based educational publisher led by Steve Seow, whose experience and expertise in educational publishing has been widely respected since the 1970s.

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**Contact us**

To request your Evaluation Pack or to place an order:

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Call: 01536 452620
Web: www.oxfordsecondary.co.uk/discoveringmathematics

Get support or register for a free Kerboodle trial

Email secondary.enquiries@oup.com or contact your local educational consultant:
www.oxfordsecondary.co.uk/repfinder

Enquire about Professional Development

Contact Oxford’s Professional Development team:
Email: events@oup.com
Call: 01865 353070

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