Guide to...

In association with

Key content

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- Developing a mastery curriculum
- Celebrating children’s achievement
- Placing a high value on maths education
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Mastering Mathematics

In association with Oxford University Press
The ‘Mastery’ approach introduced in Mastering Mathematics (Oxford University Press), is a teaching methodology that was born out of a passion for achieving mastery for every child.

The idea that mastery of primary mathematics is achievable by every child is therefore key to the mastery approach.

What is mastery of mathematics?
A mathematical concept or skill has been mastered when, through exploration, clarification, practice and application over time, a person can represent it in multiple ways, has the mathematical language to be able to communicate related ideas, and can think mathematically with the concept so that they can independently apply it to a totally new problem in an unfamiliar situation.

Mastery represents a departure from traditional teaching methods in many schools, where the focus is on ‘learning’ mathematics in unconnected chunks, rather than on ‘mastering’ the subject over time.

Placing a high value on maths education
Mastery of primary mathematics is transformative. Children who succeed with mathematics at primary school are significantly more likely to continue their education beyond 16, are more likely to be in employment as adults, and likely to earn more. The development of children’s natural ability to think logically and solve problems is both enjoyable in its own right, and vital for success in a wide variety of fields. Inequity in the teaching of mathematics is consequently a serious social issue – every child is entitled to a high-quality mathematics education.

Success in mathematics, perhaps more than in any other subjects, often seems to be used as an indicator of ‘innate’ intelligence, rather than something that everyone can achieve with effort.

Every child can succeed in mathematics, whatever their socio-economic background or prior attainment, as long as they are given appropriate learning experiences. Of course, some children do find mathematics easier than others. But the impact of quality teaching should not be underestimated.

Promoting a ‘growth mindset’
Anyone involved in primary mathematics education – teachers, teaching assistants, school leaders, family members and members of wider society – has a responsibility to aim high for every child.

Teachers adopting a mastery approach need to believe that a child’s mindset is more important than prior attainment in determining the progress they will make.
For every pupil to have a genuine opportunity to master mathematics, teachers have an enormously complex role to play. This includes creating a positive classroom culture, having a sense of what pupils currently understand, and how they might understand it, and using this to inform next steps.

This is a huge responsibility for any individual teacher, and it is therefore essential that society, parents and school leaders, and the wider community do all they can to support them. Of course, one teacher can make a significant difference, but real transformation comes when teachers work together in collaboration across the school. Mastering Mathematics examines the five key levers which schools need to undertake to achieve this.

In line with this they need to focus on developing the characteristics of a ‘growth mindset’ in their pupils. The key characteristics of which are:

- Believe that effort creates success.
- Believe that skill and ability can be increased over time.
- View mistakes as an opportunity to develop.
- Are resilient.
- Think about how they learn.

A crucial aspect of a growth mindset is not having preconceived ideas about which pupils have more or less potential. We must think carefully about how to support pupils who find a concept difficult, and how to challenge pupils who find it more
Developing a mastery curriculum

With a commitment to transforming achievement for all, the next step is to consider what changes need to be made to the structure of the curriculum.

The mastery approach follows a cumulative, age-related curriculum for depth. Deep understanding is promoted by planning fewer topics. The concepts and skills studied by a child are determined by their school year, with every child in a year group studying the same concepts and skills.

All children are given time to understand something before they move on. One surprising outcome of this commitment is that teachers feel their children pick up new concepts more quickly.

By investing time in learning number, children as young as five have number knowledge at their fingertips. This means that when they come to a new area of mathematics, such as time or length, they are able to apply their understanding of number.

Mastering Mathematics explains in detail how the following three dimensions of depth of understanding can inform teaching practice:

- Multiple representations.
- Language and communication.
- Thinking mathematically.

Celebrating children’s achievement

The final piece of the whole-school jigsaw lies in the way that what happens during mathematics lessons is connected with the rest of the school day, and with life at home. For example, how is mathematics talked about? How are pupils’ successes celebrated?

The message that mathematical ability is not innate must be reinforced consistently across the classroom. Practical ways of implementing this include:

- Displaying pupils’ mathematics successes publicly in the school. For example, displaying photos of manipulatives.
- Adopting a shared language for praise across the school that focuses on effort and engagement.
- Training all adults in the school in the importance of talking positively about mathematics.

Further information

For further information, or to order please visit: www.oxfordprimary.co.uk

About the author

Dr Helen Drury has more than a decade of experience as a mathematics teacher, head of mathematics and senior leader in both rural and challenging urban schools.

She is founding director of Mathematics Mastery, a maths teaching framework used in more than 100 UK Primary and Secondary schools, founded by headteachers, mathematics leaders and heads of mathematics working in the ARK schools network.

Helen is passionate about bringing research and best practice into the classroom to close the achievement gap and raise attainment for all children.
Professional development videos

The mastery approach is a teaching methodology that builds children’s conceptual understanding, language and communication.

To hear what the experts have to say about Mastery in Mathematics, the Oxford Owl website showcases a number of free videos from Professor Mike Askew, Dr Helen Drury, Tim Oates and Steve Anwyll which that explain the principles of the approach and offer planning support.

Assessment of Mastery resources

With the current uncertainty around assessment in primary schools, a challenge for teachers often lies in accurately measuring the extent to which children are building deep conceptual understanding in maths resulting in sustainable knowledge and skills. To support this need, Oxford University Press has collaborated with the National Centre for Excellence in the Teaching of Mathematics (NCETM) and the national Maths Hubs programme to develop free Teaching for Mastery resources.

Addressing the aims of the 2014 National Curriculum, each Teaching for Mastery chart draws on UK and international research to help teachers assess pupils’ deep understanding, including reasoning, problem solving and fluency.

The Teaching for Mastery materials outline the key mathematical skills and concepts within each yearly National Curriculum Programme of Study, followed by examples of questions, tasks and practical classroom activities to assess for mastery. Assessing for deep understanding in maths all the way from Year 1 to 6, the resources exemplify the approach endorsed by the final report from the Commission on Assessment without Levels.

The author team includes Mike Askew, Professor of Mathematics Education, the University of the Witwatersrand, Johannesburg; Debbie Morgan, Director of Primary Mathematics at the National Centre for Excellence in the Teaching of Mathematics (NCETM); Pete Griffin, Assistant Director for the NCETM; as well as several maths teachers currently practising in UK classrooms. Find out more at: www.oxfordowl.co.uk/for-school
How to be inspired by maths

Reviewed by Poppy Gibson, Key Stage 2 teacher and head of ICT, at Channing School, in north London.

If you want to revolutionise your maths teaching, simplify your maths planning, and enhance your maths lessons, you need to invest in *Inspire Maths*.

*Inspire Maths* has been adapted for UK schools from *My Pals are Here!*, the original Singapore scheme, and is a comprehensive, clearly structured, activity-centred programme that employs the Singapore written strategies to help pupils become critical thinkers and confident problem solvers.

*Inspire Maths* is a whole-school primary maths programme which can provide each year group with an entire year-long maths programme, comprising several types of books: Pupil Textbooks, Pupil Practice Books, Assessment Books, and a Teacher’s Guide.

**The Teacher’s Guide**

The programme saves teachers time by providing extensive content, with easy-to-follow long and medium-term planning to help deliver the lessons. The Teacher’s Guide even includes the target questions to ask the class, along with the discussions and explanations you need to have.

The back of the Teacher’s Guide contains the photocopy masters for each term, meaning there is no hunting around for the photocopy book – everything is contained in this concise guide.

Each lesson in the Teacher’s Guide contains Learning Objectives, Key Concepts, details of any additional resources you might need, and ideas for Additional Activities and Independent Work.

**Trialling with year 3**

With the key focus on problem solving, my year 3 class initially felt intimidated by the long word problems in both the Text Books and Practice Books. Previous maths programmes have failed to provide clear strategies for solving word problems in a consistent way.

However, after showing my class the Singapore methods of drawing bars to represent the numbers from the questions, all of the pupils began improving and developing their pace, quantity of written work, and understanding of problem solving.

My class worked through the *Inspire Maths* fractions topic in a subsequent lesson, and by combining the different books, they were able to discuss fractions, view illustrated fractions, carry out a paired activity on fractions and even play a fraction game – all described within the books with no need for additional resources.

**Time to reflect**

A particular highlight of the Practice Books is the inclusion of Maths Journal pages at the end of each topic. Pupils have the opportunity to share what they have learnt and what they can remember, easily displaying each pupil’s understanding for teacher assessment. The Assessment Books contain a wide variety of questions, some closed and some open, with the interesting inclusion of multiple choice questions.

This programme has made my life easier, planning and progression clearer, and has supported my pupils in become more independent, critical thinkers. This programme highlights why Singapore achieves so highly in mathematics.

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*This Guide to... has been produced by Primary Teacher Update with support from Oxford University Press. Visit [www.oxfordprimary.co.uk](http://www.oxfordprimary.co.uk) for information about resources for the primary classroom and for more information about the Oxford Owl school improvement service.*