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# The Shanghai Maths Project
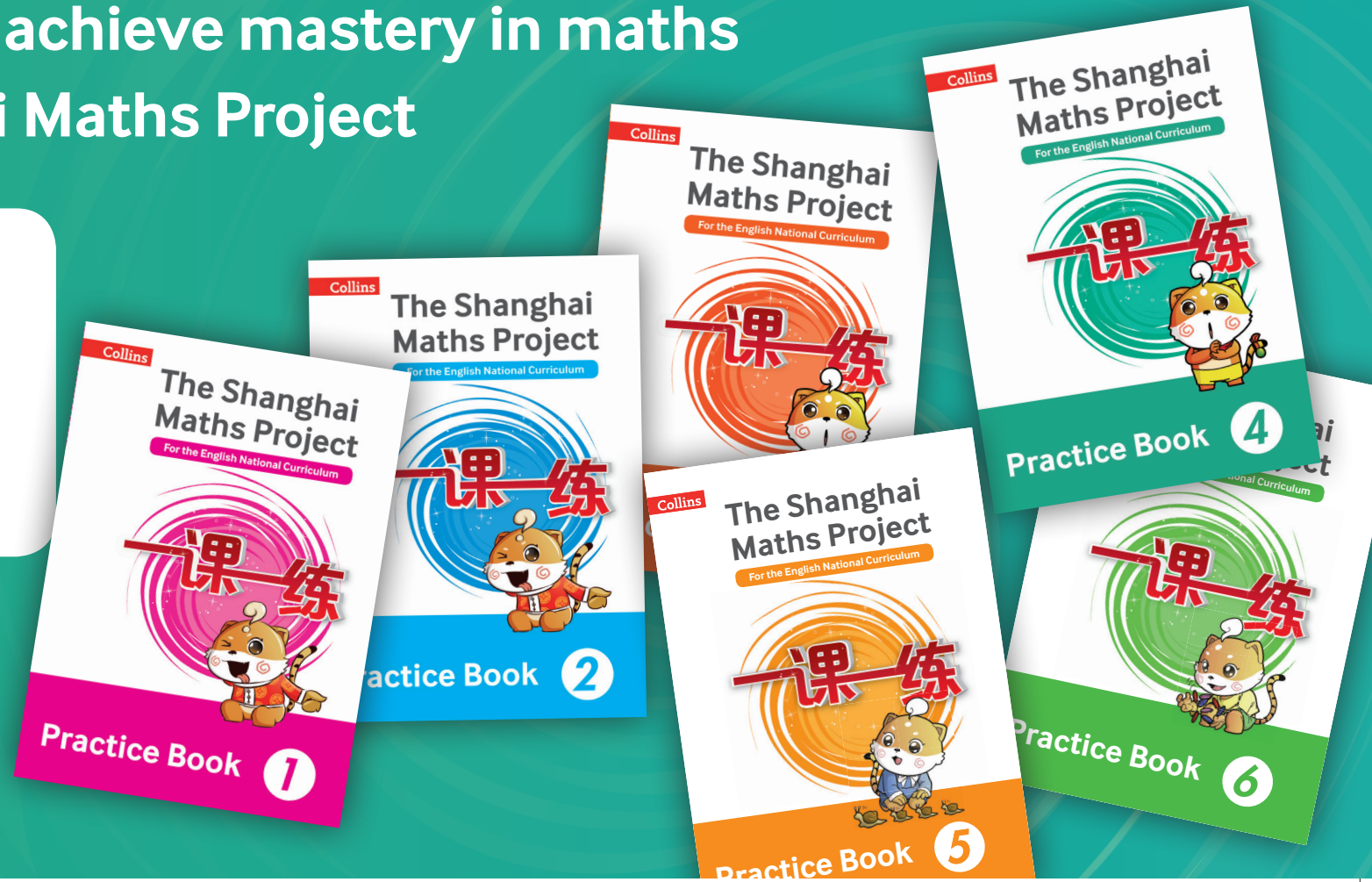
一课一练

## Help your class to achieve mastery in maths with The Shanghai Maths Project

Based on maths teaching in Shanghai, this series of practice books for years 1–11 provides complete coverage of the maths curriculum for England.

The Shanghai Maths Project
For the English National Curriculum
一课一练
Practice Book **1**

The Shanghai Maths Project
For the English National Curriculum
一课一练
Practice Book **2**

The Shanghai Maths Project
For the English National Curriculum
一课一练

The Shanghai Maths Project
For the English National Curriculum
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Practice Book **4**

The Shanghai Maths Project
For the English National Curriculum
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Practice Book **5**

一课一练
Practice Book **6**

# What is the Shanghai method of teaching maths?

The Shanghai method of teaching is a whole class teaching method that builds thorough understanding, develops higher-order thinking and is supported by the use of high quality textbooks. The Shanghai pedagogy is based on:

- A step-by-step approach that emphasises the development of basic knowledge, basic skills and thorough mastery of concepts
- Whole-class teaching where teachers reinforce that every pupil can achieve a high standard in maths
- Skilful questioning within lessons to promote conceptual understanding. Problems are used as a starting point for teaching
- Identifying and rapidly acting on misconceptions which arise through same day intervention
- Understanding is promoted through a variety of representations and exercises

'The Shanghai approach – with children taught as a whole class, building depth of understanding of the structure of mathematics, supported by the use of high-quality textbooks – is proving a hit in those schools in the country where it's been tried. And standards of maths in these schools are rising rapidly.'
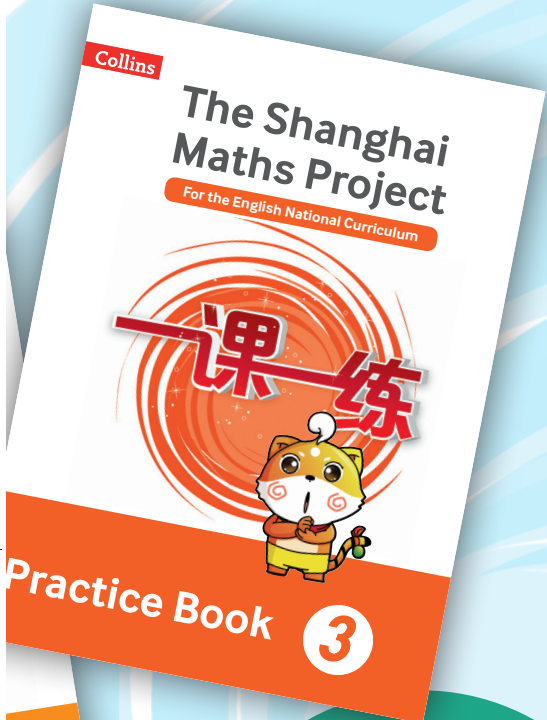Nick Gibb, Minister of State for Schools

## A Shanghai maths teaching framework usually follows this lesson structure:

1) Using problems as a starting point for teaching
2) Guiding students through exploratory activities
3) Establishing variation in practice
4) Summarising
5) Modifying based on teaching objectives

# What is The Shanghai Maths Project?



'The government is investing £41 million to expand the south Asian maths mastery approach to ensure that "thousands more young people having access to specialist teachers and quality textbooks." Nick Gibb, Minister of State for Schools

**The Shanghai Maths Project** is a collaboration between Collins and East China Normal University Press Ltd. to adapt their bestselling maths programme One Lesson, One Exercise for England, using an expert team of authors and reviewers. This carefully crafted programme has been continually refined over the last 24 years, meaning that the materials have been tried and tested by teachers and children alike. Some new material has been written for **The Shanghai Maths Project** but the structure of the original resource has been preserved and as much original material retained as possible.

## How is The Shanghai Maths Project structured?

**Teacher support available in 2017**

Lesson planning support and guidance on how to implement the Shanghai approach to teaching maths

**The Shanghai Maths Project** series consists of practice books for years 1–11, providing complete coverage of the curriculum objectives for England. With graded arithmetic exercises plus varied practice of key concepts and summative assessments for each year, each practice book offers intelligent practice and consolidation to promote deep learning and develop higher order thinking.

The practice books contain:
- 8–10 chapters made up of exercises, end of unit tests and an end of year test
- Small steps of progression, with practice at each stage
- Supplementary practice material that is not tied to a restrictive programme

**Visit www.collins.co.uk/shanghaimaths to find out more and to order your free evaluation copy today!**

# How can I use The Shanghai Maths Project Practice Books in my lessons?

**The Shanghai Maths Project Practice Books reflect the maths teaching adopted by Shanghai teachers every day in their classrooms.**

The practice books have been designed as a teacher's main or supplementary teaching resource, as well as a pupil's resource for independent learning at school or at home. They also provide parents with the tools to support and assess their child's learning of mathematics.

Each lesson in the practice books consist of two sections: *Basic Questions,* and *Challenge and Extension Questions.* The *Basic Questions* are suitable for all students, of all different abilities, and provide engaging questions for your lesson. The *Challenge and Extension Questions* have been crafted to motivate students and develop confidence, offering them the chance to challenge their mathematical understanding.

**Each unit begins with mathematics questions or problems to motivate pupils.**

**The 'Basic Questions' section is designed to develop pupils' basic knowledge and skills and encourage thorough mastery of concepts.**

## 1.11 Counting and ordering numbers (2)

📖 **Learning objective**

Write ordinal numbers to 10

✏️ **Basic questions**

❶ Count the birds.

There are (    ) 🐦 in total.

Counting from the left, colour the fourth 🐦 yellow and all the 🐦 after the sixth one yellow. There are (    ) coloured 🐦 in total.

❷ Put heights in order starting from the tallest. One has been done for you.

(    ) (    ) (first) (    ) (    ) (    )

Sample material from
*The Shanghai Maths Project Practice Books 1 and 4*

Addition and subtraction within 10

**2** Fill in the boxes.

$8 \xrightarrow{-4} \square$    $10 \xrightarrow{-5} \square$    $6 \xrightarrow{-3} \square$

$5 \xrightarrow{-2} \square$    $7 \xrightarrow{-3} \square$    $8 \xrightarrow{-2} \square$

$\square \xrightarrow{-2} 5$    $\square \xrightarrow{-3} 0$    $\square \xrightarrow{-1} 9$

**3** Calculate.

$8 - 5 =$     $10 - 4 =$     $4 - 4 =$     $6 - 0 =$

$6 - 3 =$     $8 - 7 =$     $9 - 6 =$     $8 - 3 =$

$8 - 1 =$     $5 - 2 =$     $7 - 6 =$     $10 - 7 =$

**Challenge and extension question**

**4** Look at the picture and then write the number sentences.

I caught 6 fish
I caught 4 fish

How many fish did the white cat and black cat catch altogether?

$\square \bigcirc \square = \square$

How many more fish did the white cat catch than the black cat?

$\square \bigcirc \square = \square$

How many more fish does the black cat need to catch in order to have as many fish as the white cat has caught?

$\square \bigcirc \square = \square$

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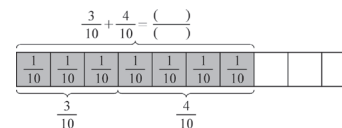**4.2   Addition and subtraction of fractions (1)**

**Learning objective**

Add fractions with the same denominator

**Basic questions (1)**

**1** Think carefully. Fill in the brackets and calculate.

(a) $\frac{3}{10} + \frac{4}{10} = \frac{3+4}{10} = \frac{(\ \ )}{10}$

We can also calculate this way: adding ( ) lots of $\frac{1}{10}$ and ( ) lots of $\frac{1}{10}$, the sum is ( ) lots of $\frac{1}{10}$, which is ( — ). We can represent the addition using the diagram below. (Can you use another way to represent this?)

$$\frac{3}{10} + \frac{4}{10} = \frac{(\ \ )}{(\ \ )}$$

| $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | | |

$\frac{3}{10}$          $\frac{4}{10}$

(b) $\frac{7}{17} + \frac{9}{17} = \frac{7+9}{17} = \frac{(\ \ )}{17}$

We can also calculate this way: adding ( ) lots of $\frac{1}{17}$ and ( ) lots of $\frac{1}{17}$, the sum is ( ) lots of $\frac{1}{17}$, which is ( ). Can you draw a diagram to represent $\frac{7}{17} + \frac{9}{17}$?

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Addition and subtraction of fractions

**5** In an auto rally, the Drucker team drove $\frac{3}{10}$ of the whole journey on the first day. On the second day, they drove $\frac{4}{10}$ of the whole journey and on the third day they drove $\frac{2}{10}$ of the journey. Using a fraction, how much of the journey did the team drive in the first three days?

**Challenge and extension questions**

**6** Write a suitable fraction or a number in each bracket.

(a) $\frac{3}{10} + (\ \ ) = \frac{1}{2}$          (b) $\frac{3}{10} + (\ \ ) = 1$

(c) $\frac{9}{22} + (\ \ ) = \frac{1}{2}$          (d) $\frac{20}{24} = \frac{(\ \ )}{48} = \frac{5}{(\ \ )}$

**7** Look for patterns and then fill in the $\square$ with a suitable number.

$\frac{1}{2} = \frac{1}{3} + \frac{1}{6}, \frac{1}{3} = \frac{1}{4} + \frac{1}{12}, \frac{1}{4} = \frac{1}{5} + \frac{1}{20}$

$\frac{1}{5} = \frac{1}{\square} + \frac{1}{\square}, \frac{1}{9} = \frac{1}{\square} + \frac{1}{\square}, \frac{1}{50} = \frac{1}{\square} + \frac{1}{\square}$

# What is the difference between Shanghai and Singapore maths teaching?

## Differences

## Similarities

### Shanghai

- Strong emphasis on teacher-student interaction and engagement
- Focuses more on the abstract
- Teaching with variation
- Uses a higher variety of visualisations than the Singapore approach, making it more flexible
- Pedagogically designed to be rigorous and challenging
- Shanghai students achieve higher results in mathematics (see PISA results: 613 vs 573 on average score)

### Singapore

- Teacher-centred approach, reinforced by exercises
- Focuses more on using visualisation to guide students
- Heavily relies on the CPA (concrete-pictorial-abstract) and model method

- An emphasis on whole-class teaching
- Central use of textbooks and learning materials

# Meet the experts behind The Shanghai Maths Project

## Professor Lianghuo Fan, Series Editor

**"The series will help students lay strong foundations, nurture deep learning and develop problem solving skills in mathematics."**
**Professor Lianghuo Fan**

Professor Lianghuo Fan is a Personal Chair in Education at Southampton Education School, University of Southampton, where he is also the Head of Mathematics and Science Education Research Centre. He received his MSc from East China Normal University, Shanghai and his PhD from the University of Chicago, USA. Prof. Fan has extensive experience in education and research in China, USA, Singapore and now the UK.

## Paul Broadbent, UK Curriculum Consultant

Paul Broadbent is an experienced primary teacher and a former deputy head teacher, Ofsted inspector, advisor and Senior Teaching Fellow at the University of Warwick. He is currently a full-time writer and consultant, giving planning support to many schools through his *'Broadbent Maths Planning Menu'*. He is a best-selling author of over 450 maths books, with recent texts published in the Middle East, Africa and the UK. As well as his many maths books for schools and the home, he has written a number of schools television, radio and computer programmes for the BBC.

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