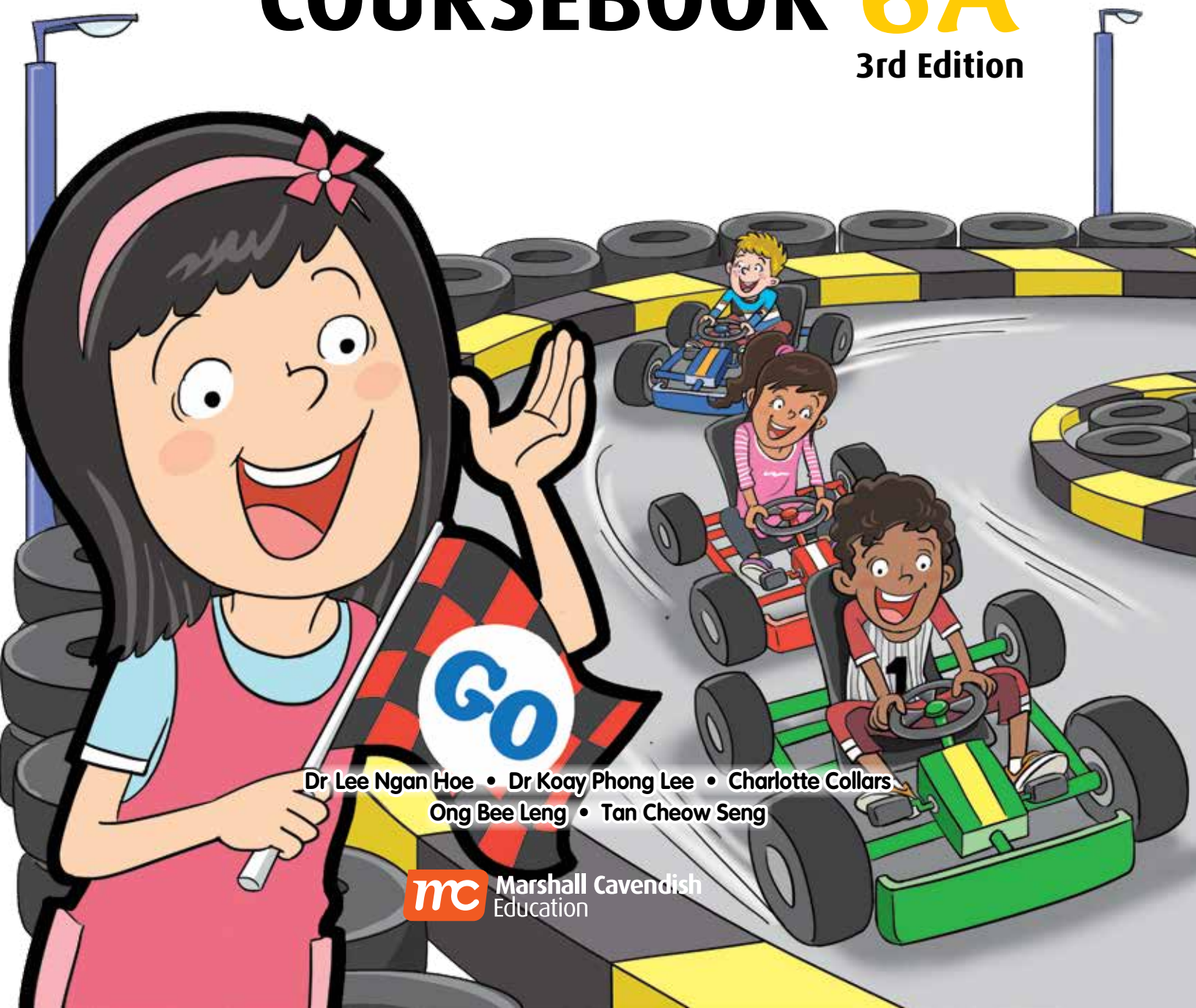
Shaping Maths

COURSEBOOK 6A

3rd Edition



Dr Lee Ngan Hoe • Dr Koay Phong Lee • Charlotte Collars
Ong Bee Leng • Tan Cheow Seng

Marshall Cavendish Education

Preface

Shaping Maths (3rd Edition) is an instructional package written according to the 2013 Ministry of Education, Singapore, primary mathematics syllabus. The package is designed to meet the learning needs of pupils from Primary 1 to 6. The Primary 6 package consists of two Coursebooks, two Activity Books and two Teacher's Planning Guides.

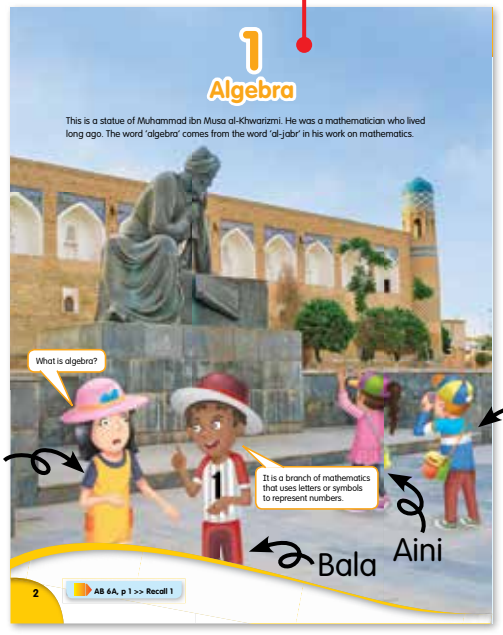
Approach

Shaping Maths (3rd Edition) adopts a thematic approach towards the learning of mathematics in the upper primary levels. These themes reflect various aspects of pupils' lives and help provide a concrete framework for the mathematical concepts that pupils learn in class. Pupils' learning is then reinforced through the use of pictures and icons before they are introduced to the formal symbolic mode of mathematical representation. The themes also provide an environment for pupils to experience the interdisciplinary nature of learning.

Continuing research in education has resulted in the introduction of new features in the third edition. Through these features, educators are further equipped with various strategies in addressing teaching and learning needs. These features include hands-on activities, group/pair work and open-ended questions to encourage exploration and in-depth thinking among pupils. This will equip pupils well for the challenges of the 21st century.

Features

Colourfully illustrated unit openers encourage rich and active pupil participation in learning and connections to everyday life through whole class discussion.



Friends of Shaping Maths

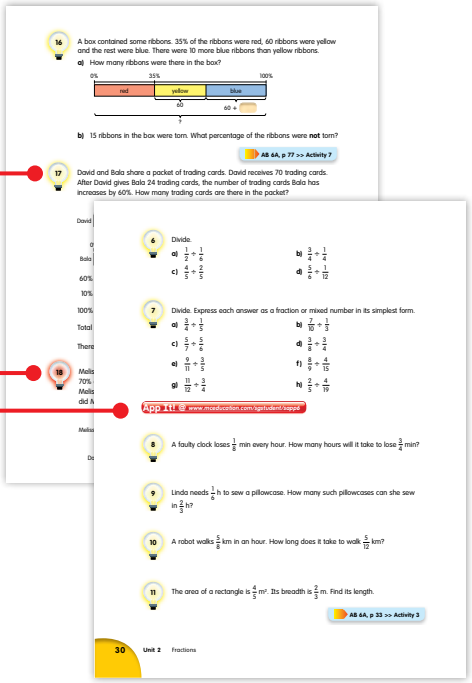
The themes of the Coursebook revolve around Aini, Bala, Caili and David. The characters stimulate pupils' interest and heighten their involvement in the learning process.

Question classification helps teachers spend their time more effectively by using the appropriate questions to get pupils to master the necessary skills.

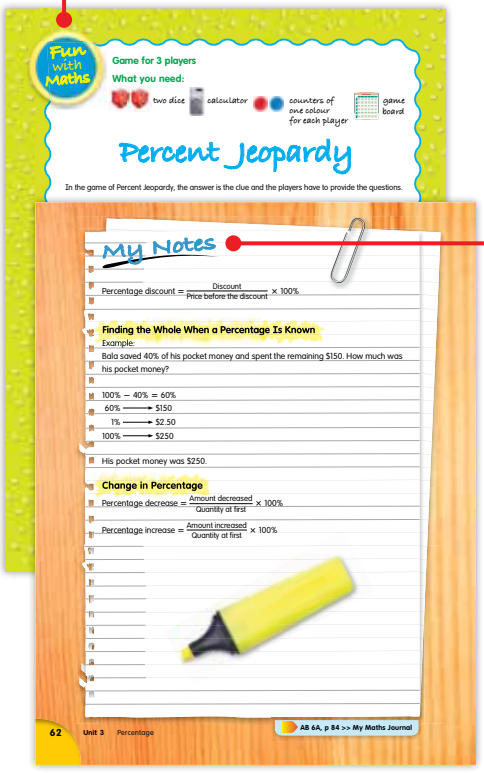
Reinforcement of current concepts

Higher-order thinking skills/enrichment

App It! helps pupils master concepts learnt through engaging and interactive applets.

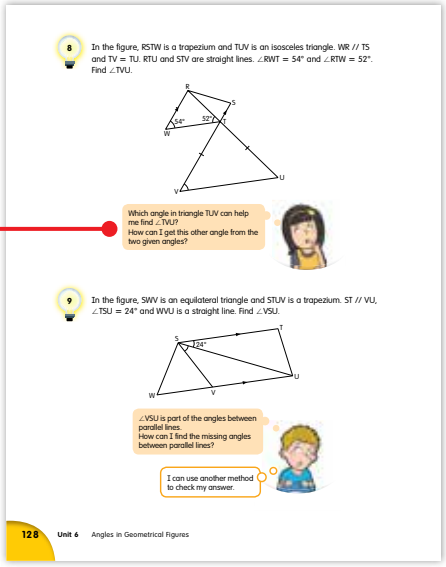


Fun with Maths engages pupils in interactive maths activities that encourage exploration, discovery and active thinking.



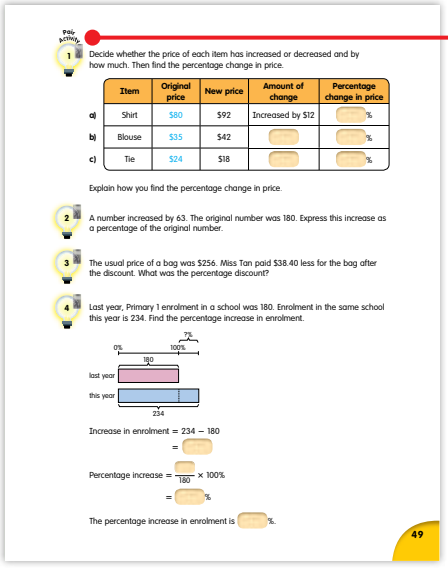
My Notes helps pupils consolidate and recall, and commit to memory key learning concepts.

Guiding questions build the habit of checking to understand a problem.

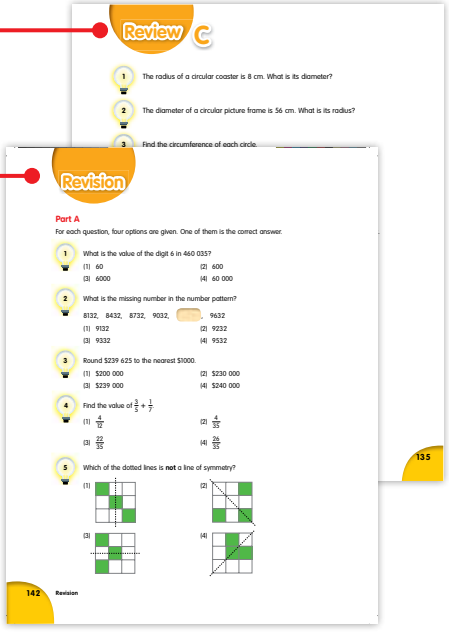


NEW!

Activities have been included to provide more individual, pair and group hands-on learning. These, along with the manipulatives required, are highlighted for ease of use.



Review and Revision provide a formative assessment of pupils' understanding and help to consolidate learning.

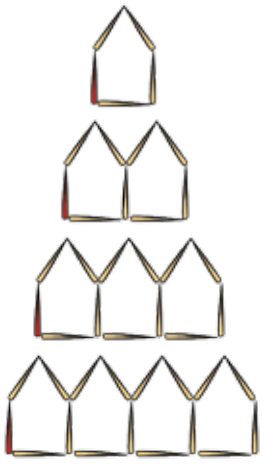


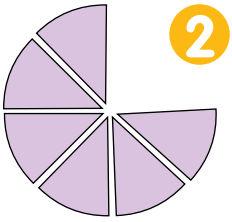
Sections with this icon involve the use of calculators.

CONTENTS

1 Algebra 2

- Algebraic Expressions 3
- Simplifying and Evaluating Algebraic Expressions 8
- Simple Algebraic Equations 12
- Solving Word Problems 14





2 Fractions 20

- Dividing a Proper Fraction by a Whole Number 22
- Dividing a Whole Number by a Proper Fraction 25
- Dividing a Proper Fraction by a Proper Fraction 28
- Solving Word Problems 31

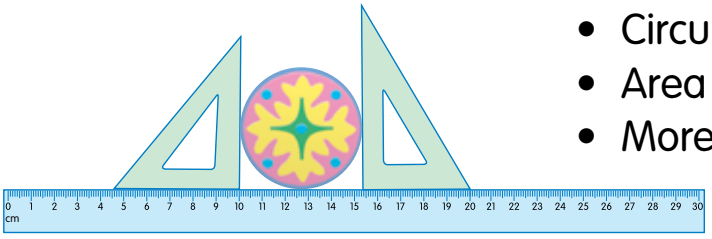
Review A 39

3 Percentage 42

- Finding the Whole When a Percentage Is Known 44
- Change in Percentage 48
- Solving Word Problems 52

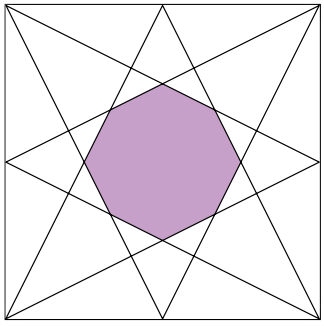
4 Ratio 63
- Ratios and Fractions 64
- Equivalent Fractions and Ratios 69
- Changing Ratios 78

Review B 92



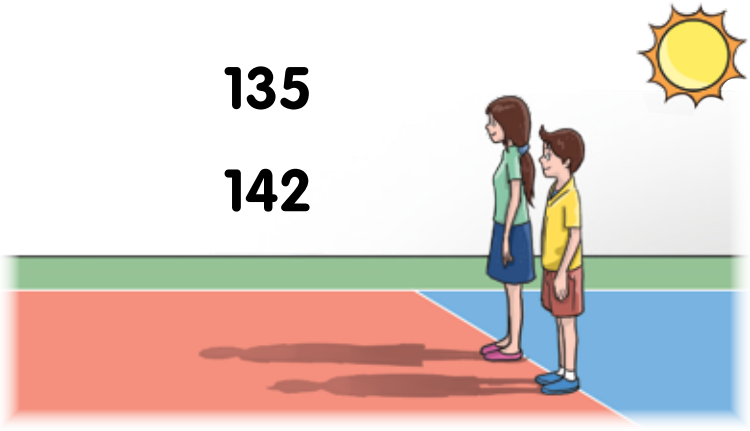
5 Circles 96
- Radius and Diameter 97
- Circumference 101
- Area 108
- More Problems on Circles 115

6 Angles in Geometrical Figures 122
- Finding Angles in Geometrical Figures 124



Review C 135

Revision 142



1 Algebra

This is a statue of Muhammad ibn Musa al-Khwarizmi. He was a mathematician who lived long ago. The word 'algebra' comes from the word 'al-jabr' in his work on mathematics.

AB 6A, p 1 >> Recall 1

Algebraic Expressions

Aini's mother is 23 years older than Aini.

When Aini was 1 year old,
her mother was 24 years old.

When Aini was 7 years old,
her mother was 30 years old.

Aini is 12 years old now.
Her mother is 35 years old.

Use the information above to find the missing numbers in the table.

Aini's age (years)	Her mother's age (years)
1	24

When Aini was _____ years old, her mother was _____ years old.

We can use a letter to represent the unknown number.
When Aini is x years old, her mother is $(x + 23)$ or $(23 + x)$ years old.
$(x + 23)$ and $(23 + x)$ are **algebraic expressions** in terms of x.

1 How much pocket money does David's brother get?

David: Our father gives us pocket money every week.

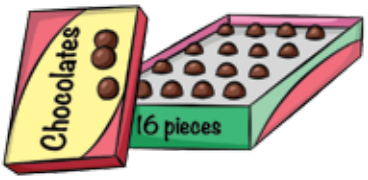
David's brother: I get $2 less than David.

When David gets $15, his brother gets $13.

a) When David gets $18, his brother gets $ ____.

b) When David gets $y, his brother gets $ ____.

2 Find the missing numbers.



There are 16 pieces of chocolate in a box.

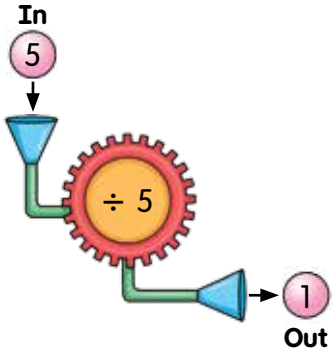
We write $16 \times p$ as $16p$. $16p$ is an algebraic expression in terms of p.

a) There are ____ pieces of chocolate in 3 boxes.

b) There are ____ pieces of chocolate in 8 boxes.

c) There are ____ pieces of chocolate in p boxes.

3 Use the machine to find the missing numbers and letters in the table.



In	Out
5	1
10	2
15	
a	

We write $a \div 5$ as $\frac{a}{5}$.

What will you get when you put b in the machine?

4 The table below shows the number of toothpicks used to make figures of houses.

a) Count the number of toothpicks used to make the houses.

Figure	Number of houses	Number of toothpicks used
	1	1 + ☐ = ☐
	2	1 + ☐ = ☐
	3	1 + ☐ = ☐
	4	1 + ☐ = ☐

Number of toothpicks used = 1 + 4 × Number of houses

b) How many toothpicks do you need to make 10 houses?

c) How many toothpicks do you need to make *n* houses? Explain.

AB 6A, p 3 >> Activity 1

5 Find the missing numbers and expressions.

a) Caili is 12 years old.

i) 2 years ago, she was ☐ years old.

m years ago, she was ☐ years old.

ii) In 4 years' time, she will be ☐ years old.

In *m* years' time, she will be ☐ years old.

b) Mary is *n* times as old as Caili.

i) Express Mary's age in terms of Caili's age.

ii) How old was Mary 5 years ago?