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# PRIME<sup>™</sup> Mathematics

Proven to be world's best practice

NEW TO  
AUSTRALIA!



**Prime mathematics** is a composite of the approaches used by the three top-performing nations in primary mathematics education according to TIMSS • Singapore • South Korea • Hong Kong

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# PRIME Mathematics

## Use world's best practice to teach mathematics

**Australia** aims to be in the **top 5** performing nations in international educational studies of mathematics such as TIMSS. Singapore, South Korea and Hong Kong are currently numbers 1, 2 and 3 in TIMSS. PRIME Mathematics has been adapted from the highly acclaimed and widely proven Primary Mathematics Project developed by the Ministry of Education in Singapore. But more than that, it combines **world's best practice pedagogy** from the **three top-performing nations** into a comprehensive and **proven maths approach**. The evidence is in. **It works!**

### PROBLEM SOLVING IS CENTRAL

The Mathematics Framework used in PRIME has problem solving as being central to mathematics learning. It is similar to the approach used by the Singapore Ministry of Education that turned Singapore from a low-performing maths nation into a high-performing one.

**Lesson 3 Problem Solving**  
**Word problems**

**Let's Learn**  
Daniel has 14 blue paper clips. He finds 5 more red ones. How many paper clips does he have altogether?

**1 Understand the problem.**  
How many paper clips does Daniel have? How many more does he find? What do I have to find?

**2 Plan what to do.**  
I can draw a picture.

**3 Work out the answer.**  
14 + 5 = 19  
part part whole  
Daniel has 19 paper clips altogether.

**4 Check**  
Did you answer the question? Is your answer correct?  
If 14 + 5 = 19, then 19 - 5 should equal 14.

My answer is correct.

✓ 1. Understand  
✓ 2. Plan  
✓ 3. Answer  
✓ 4. Check

Real world problems

Use of the bar model to solve problems

Student meta-language explicitly 'thinks through' the problem



### CONSISTENT PEDAGOGY

**Let's Remember**

assesses readiness or new learning

**Let's Learn**

builds on concepts and skills learnt previously

**Let's Do**

provides scaffolded guided practice

**Let's Practice**

consolidates concepts and skills taught and summative assessment

**Think About It**

students consider alternate solutions

### CONCRETE – PICTORIAL – ABSTRACT APPROACH

Concepts are taught using:

**Math Lab**

physical, hands-on or concrete materials

**Picture It**

pictorial representations

**-1 4  
3 2 +**

symbolic representations.

**Lesson 3 Problem Solving**  
**Mind stretcher**

**Let's Learn**  
Jo baked a round cake. She invited 7 friends to share the cake with her. How many ways can she cut the cake equally so that everyone gets 1 piece?

**1 Understand the problem.**  
How many cakes did she bake? How many friends did she invite? How many people were to share the cake? What do I need to do?

**2 Plan what to do.**  
I can act it out!

**3 Work out the answer.**

**4 Check**  
Did you answer the question? Is your answer correct?  
There are 4 ways. In each way, each piece is equal. My answer is correct.

4-step problem-solving process

Problem-solving strategies are systematically taught

**Lesson 3 Other Units of Time**

**You will learn to...**

- know the number of days in a month and in a year
- understand the relationship between 1 hour, 1 day, 1 week, 1 month and 1 year

**Understanding the relationship between units of time**

**Let's Learn**

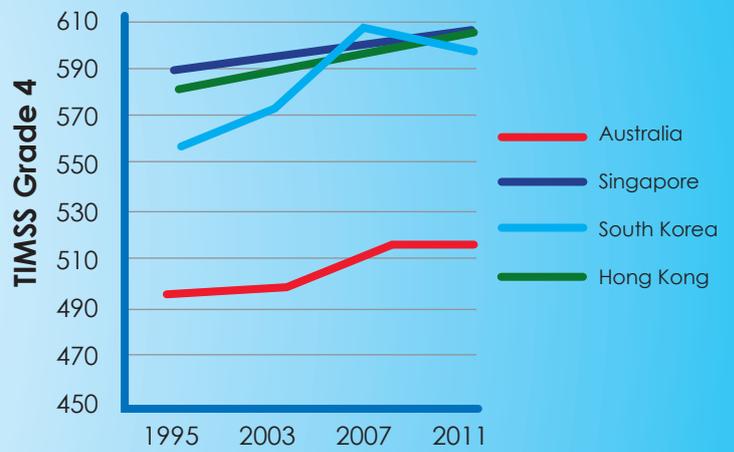
a) The clocks below show what Janet did at different times of the day.

midnight, 6 hours, 6 a.m., 2 hours, 8 a.m., noon, 7 hours, 10 p.m., 3 p.m., hours, hours, hours

There are 24 hours in a day. There are 12 hours from midnight to noon. There are hours from noon to midnight.

## Why will PRIME work?

1. **Explicit problem solving** is at the centre for teaching and learning – with an emphasis on both the **processes** and **strategies**, including the **'bar model'**
2. Students learn through **consistent pedagogy** and a **concrete – pictorial – abstract approach**
3. Topics take a **'deep dive'** into the development of **concepts** to build mastery through scaffolding
4. Students actively develop **meta-language** and **metacognitive thinking**
5. Teachers' **professional learning** is enhanced through using world's best practice.



## DEEP DIVE INTO CONCEPTS

Each chapter treats a topic in-depth and carefully scaffolds the concept being developed.

For example **Coursebook 3B: Fractions:**

- Naming parts of a fraction → comparing fractions
- finding equivalent fractions → expressing a fraction in its simplest form
- comparing using equivalent fractions → adding fractions → subtracting fractions
- fraction word problems

**Lesson 2 Equivalent Fractions**

**You will learn to...**

- find equivalent fractions
- express a fraction in its simplest form
- compare using equivalent fractions

**Understanding equivalent fractions**

**Let's Learn**

$\frac{1}{2}$  of the paper is shaded.  
1 out of 2 equal parts.

$\frac{2}{4}$  of the paper is shaded.  
2 out of 4 equal parts.

$\frac{4}{8}$  of the paper is shaded.  
4 out of 8 equal parts.

The fractions  $\frac{1}{2}$ ,  $\frac{2}{4}$  and  $\frac{4}{8}$  have different numerators and denominators, but they are equal.

$\frac{1}{2} = \frac{2}{4} = \frac{4}{8}$

**52**  $\frac{1}{2}$ ,  $\frac{2}{4}$  and  $\frac{4}{8}$  are **equivalent fractions**.  
 $\frac{1}{2}$  and  $\frac{2}{4}$  are different ways of writing  $\frac{1}{2}$ .  
Two more equivalent fractions of  $\frac{1}{2}$  are \_\_\_\_\_.

**Lesson 5 Problem Solving**

**Word problems**

**Let's Learn**

Jude ate  $\frac{1}{3}$  of a custard tart.  
What fraction of the tart was left?

- 1 **Understand the problem.**  
What was eaten?  
What fraction of the tart was eaten?  
What do I have to find?  
What information is not useful?
- 2 **Plan what to do.**  
I can use the picture given.
- 3 **Work out the Answer.**  
 $1 - \frac{1}{3} = \frac{3}{3} - \frac{1}{3} = \frac{2}{3}$
- 4 **Check.**  
Did you answer the question?  
Is your answer correct?  
He ate 1 of 3 equal pieces of the tart.  
 $3 - 1 = 2$   
2 of 3 equal pieces of the tart were left.  
 $\frac{2}{3}$  of the tart was left.  
 $\frac{1}{3}$  and  $\frac{2}{3}$  make 1 whole.  
My answer is correct.

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## DEVELOPMENT OF METACOGNITION

Students are actively encouraged to be aware of their learning. They are invited to control their thinking processes and to monitor and self-regulate their learning.

**Lesson 1 Making Subtraction Stories**

**You will learn ...**

- the meaning of subtraction
- to tell number stories for subtraction sentences
- to write subtraction sentences

**Understanding the meaning of subtraction**

**Let's Learn**

Talk about the picture.

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Learning expectations and experiences are clearly stated in student language

**Let's Learn**

There are 7 children.  
2 of them are girls.  
There are 5 boys.

We write the subtraction sentence:

$7 - 2 = 5$   
whole part part

We read it as seven minus two is equal to five.  
- means **subtract**.  
**Subtraction means taking away.**

We subtract 2 (part) from 7 (whole) to get 5 (part).  
Subtract 2 from 7. The answer is 5.

**7 - 2 = 5**

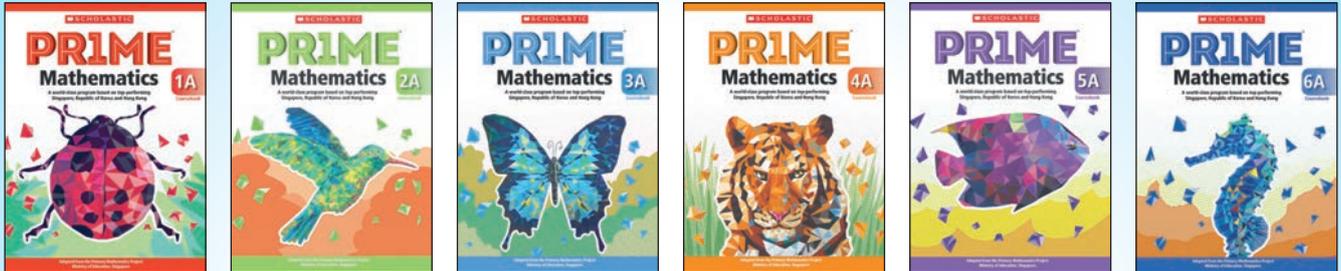
**59**

Mathematical concepts, language and symbols are explicitly explained

Thought bubbles encourage and guide mathematical thinking.

## Coursebooks

There are two Coursebooks at each year level. They are the core component of PRIME for students. They introduce and develop concepts and skills to mastery.



## Practice Books

There are two Practice Books for each year level that directly link to the Coursebooks. They contain practice exercises and reviews for formative and summative assessment.

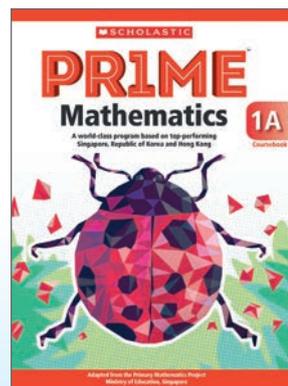
## Digital Resources

All Coursebook and Workbook content will be available for use on interactive whiteboards.

## Teacher's Guides – Professional Learning

There is a Teacher's Guide for each Coursebook. Comprehensive lesson plans free up teachers from spending time planning to spend time with students. Lesson notes to support each page in the student books show teachers how to effectively deliver each lesson.

They also provide teachers with professional learning, such as giving teachers the 'heads-up' on likely student mistakes and ways to avoid them.



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Want to know more?  
**JOIN the PRIME Email Network**

Please discuss with your Territory Manager, email us at  
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or call **02 4329 9408**