Singapore Math Study Guide Book

A Practical Guide for Parents and Students — Primary 1–6

Compiled from the Singapore Primary Math guides on pslehero.org

pslehero.org/singapore-math.html

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Contents

How to Use This Guide

This book gathers the ten Singapore Primary Math guides from pslehero.org into a single reference you can read straight through, revisit by chapter, or print.

A few suggestions for getting the most out of it:

- Start with Part 1 if Singapore Math is new to you; go straight to Part 3 if you want this year's topics.
- Cover the solution when you reach a worked example, try it first, then compare. Redrawing the bar diagrams by hand — pencil and ruler — is part of the learning.
- Use the syllabus checklists in Part 3 to spot gaps before they compound.
- The Appendix at the end of this book provides direct links to official MOE syllabus documents and online reference guides.

A daily habit that helps: ask your child one syllabus-related question each day — "What did you learn in maths today that you didn't know yesterday?" If the answer is vague, a few minutes of revision on the current topic can prevent gaps from compounding.

Part 1 — Understanding Singapore Math

What Is Singapore Math

Singapore Primary Math

Singapore Primary Mathematics is recognised around the world for producing students who think deeply and solve problems logically. This guide explains what Singapore Math is, how it works from Primary 1 to Primary 6, and how parents — whether in Singapore or overseas — can better support their child's learning journey.

What Is Singapore Math?

Singapore Math is not a single textbook or worksheet series. It is the **pedagogical approach** behind Singapore's Primary Mathematics curriculum, developed and refined by the Ministry of Education (MOE) since the 1980s. The goal is to develop students who do not just compute the right answer — they understand *why* the answer is correct and can apply the same reasoning to unfamiliar problems.

Singapore has consistently ranked at the top of international mathematics assessments such as TIMSS (Trends in International Mathematics and Science Study). As a result, the Singapore approach has been adopted by schools in the United States, the United Kingdom, Australia, and across Asia.

For parents new to Singapore: If your child has just joined a Singapore primary school, the methods they will encounter — drawing bar models, listing possible answers systematically, working backwards — may look different from what you experienced at school. This guide will help you understand the logic behind each approach.

The MOE Mathematics Framework

The Singapore curriculum places **Mathematical Problem Solving** at the centre of everything. It is supported by five interconnected components, often called the Pentagon Framework:

Concepts

Number, algebra, geometry, statistics, probability — the core mathematical ideas students need.

Skills

Procedural fluency: computing accurately, estimating, using tools and technology correctly.

Processes

Reasoning, communication, modelling, and the heuristic strategies used to tackle non-routine problems.

Metacognition

Thinking about thinking — monitoring your own approach and choosing when to change strategy.

Attitudes

Confidence, perseverance, and genuine interest in mathematics — built through success at the right level of challenge.

The Concrete-Pictorial-Abstract (CPA) Approach

The most distinctive feature of Singapore Math is the **CPA progression**. Rather than introducing numbers and symbols straight away, students move through three stages:

Concrete

Students use physical objects — counters, blocks, fraction strips — to explore and manipulate mathematical ideas in a tangible way.

Pictorial

Students represent quantities and relationships visually, most famously with the **bar model**, before working with abstract notation.

Abstract

Only when the concept is understood through the earlier stages do students move to symbols, equations, and algebraic notation.

This progression means that when a P5 student draws a bar model to solve a fraction or percentage problem, they are not using a trick — they are applying a visual representation that they have built understanding of since Primary 1. The bar model is the bridge that eventually leads to algebra in primary 6 and secondary school.

Here is a classic Singapore Math word problem and how the bar model makes it visual and manageable.

Word Problem — P4 Level

Ali and Bala share 84 stickers. Ali has 3 times as many stickers as Bala. How many stickers does Bala have?

```
Step 1 — Draw a bar model:
Bala: [ 1 unit ]
Ali: [ 1 unit ][ 1 unit ][ 1 unit ]
Step 2 — Find the total units:
1 (Bala) + 3 (Ali) = 4 units total
Step 3 — Find the value of 1 unit:
4 units = 84 stickers → 1 unit = 84 ÷ 4 = 21 stickers
Answer: Bala has 21 stickers.
```

```
Notice how the bar model converts the words "3 times as many" into a visual. Students
who understand this diagram can solve ratio, fraction, and percentage problems using
the same logic — even when the numbers become much harder at P5 and P6.
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For students in Singapore, Primary 6 Mathematics culminates in the Primary School
Leaving Examination (PSLE). The PSLE Maths paper tests all the skills built from P1 to
P6 — but with harder, multi-step questions that integrate several concepts at once.
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Understanding the Singapore Math method from an early stage is the best preparation. A
strong grasp of the CPA approach and regular practice with problem-solving heuristics
help students approach unfamiliar exam questions methodically.
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Practise the Singapore Math Method

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Consistent, short daily practice is one of the most effective habits for building
mathematical fluency.
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Is Singapore Math suitable for international homeschool families?

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Yes. The Singapore Math method has been adopted widely by homeschool communities in the
United States, United Kingdom, and Australia precisely because it teaches deep
conceptual understanding rather than rote procedures. The CPA progression and heuristic
strategies are applicable to any child learning mathematics, regardless of whether they
will sit the PSLE.
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My child is in P3 and struggling. Where should I start?

Start by checking whether the difficulty is conceptual (they do not understand the idea) or procedural (they understand but make calculation errors). For P3, the most common conceptual struggles are around multiplication, division, and fractions. Revisiting bar model drawing — even for simple addition and subtraction — often rebuilds confidence quickly, because students see the problem rather than just hearing it.

Does the Singapore Math method teach algebra?

Algebra is introduced formally in Primary 6, but the foundations are built much earlier. Bar model drawing with unknowns (representing "1 unit" or "1u") is effectively a visual form of algebraic thinking. Students who are fluent with bar models often find the transition to formal algebraic notation in secondary school more natural.

What is the difference between this guide and the PSLE Maths guides on this site?

The PSLE Maths guides focus on exam preparation: Paper 1 and Paper 2 structure, time management, common question types tested, and how to avoid marks lost to careless errors. This guide and the Singapore Primary Math series focus on the underlying method — understanding why Singapore Math works and how it develops across all six primary years. Both are useful, but for different purposes.

The Primary Mathematics Syllabus

Singapore Primary Math

Every parent wants to know: "What exactly will my child learn this year in maths?" The official MOE Primary Mathematics syllabus provides the answer. This guide breaks down the syllabus level by level, explains how it connects to the Singapore Math method, and gives you practical ways to support your child at every stage from Primary 1 to Primary 6.

What Is the Primary Mathematics Syllabus?

The **Primary Mathematics Syllabus** is the official curriculum document published by Singapore's Ministry of Education (MOE). It defines the mathematical content, skills, and learning outcomes that students are expected to achieve at each primary level. All Singapore primary schools — government, government-aided, and independent — follow this syllabus.

The syllabus is built around five interconnected components, known as the **Pentagon Framework**: Concepts, Skills, Processes, Metacognition, and Attitudes. At the centre is **Mathematical Problem Solving**. Every topic in every level serves this central goal — students do not just learn procedures; they learn how to think mathematically.

The content is organised into three strands:

- **Number and Algebra** — Whole numbers, fractions, decimals, ratio, percentage, and algebra
- **Measurement and Geometry** — Length, mass, volume, time, area, perimeter, angles, and geometric properties
- **Statistics** — Picture graphs, bar graphs, line graphs, and pie charts

These strands are not taught in isolation. The syllabus uses a **spiral approach**: topics are introduced at a foundational level, revisited later with greater depth, and connected across strands as students progress.

First time encountering the syllabus? Start with the Singapore Math parent guide for a broader overview of the method and how the syllabus connects to the CPA approach and heuristics.

The 2021 Syllabus: Implementation Timeline

The 2021 Primary Mathematics syllabus was introduced progressively, one year level at a time. This means that between 2021 and 2025, some year groups followed the 2021 syllabus while others remained on the 2013 syllabus. As of **2026, all Primary 1 to Primary 6 students are on the 2021 syllabus**.

Syllabus rollout

Year	Syllabus coverage
2021	Primary 1 only
2022	Primary 1 to Primary 2
2023	Primary 1 to Primary 3
2024	Primary 1 to Primary 4
2025	Primary 1 to Primary 5
2026	Primary 1 to Primary 6 (full transition)

This phased rollout means that a student entering Primary 1 in 2025, for example, experienced the 2021 syllabus from day one. A student entering Primary 6 in 2025 was still on the 2013 syllabus for their final year and transitioned to the 2021 syllabus only in 2026.

The syllabus tells teachers **what** to teach. The Singapore Math method — the Concrete-Pictorial-Abstract (CPA) approach, bar modelling, and heuristics — tells them **how** to teach it. They work together as two sides of the same coin.

For example, the syllabus states that P4 students must "add and subtract unlike fractions." The Singapore Math method teaches this by having students:

- **Concrete** — Fold paper strips or use fraction tiles to see that 1/2 and 1/4 represent different-sized parts
- **Pictorial** — Draw bar models showing two fractions with different denominators
- **Abstract** — Write the equivalent fractions and compute 1/2 + 1/4 = 2/4 + 1/4 = 3/4

This is why the same syllabus produces such different classroom experiences in Singapore compared to many other countries. The method transforms the what into a how that builds deep understanding.

Key Changes in the 2021 Syllabus vs the 2013 Syllabus

The 2021 syllabus introduced several meaningful changes. If you are helping an older sibling who followed the 2013 syllabus, be aware that some topics moved or were removed at that time. For current PSLE preparation, use the MOE syllabus updated in October 2025. (See Appendix A for the official link.)

Change	Detail	Level
Historical 2021 summary	Speed was described as moving to Secondary 1 in the original comparison; the October 2025 update includes Rate and Speed for current primary Mathematics.	Check current syllabus
Removed from primary	Turns and 8-point compass	P4 removed
Moved earlier	Time: 12-hour and 24-hour clock	P4 → P3
Moved earlier	Telling time to 5 minutes	P2 → P1
Moved earlier	Pie charts and nets	P6 → P4
Moved later	Average (mean of a set of data)	P5 → P6
Moved later	Ratio	P5 → P6

Why this matters: If your child is using resources (assessment books, worksheets, online practice) published before 2021, some topics may be missing or placed at the wrong level. Always check that the resource aligns with the 2021 syllabus specifically. For P6, note that both average and ratio now appear at P6 — if your older child studied them in P5, the younger one will encounter them a year later. Algebra is introduced in P6, not P5.

Does the syllabus specify which textbooks to use?

No. MOE sets the syllabus content and outcomes, but individual schools choose their own textbooks and resources. Most schools use the "My Pals Are Here!" or "Shaping Maths" textbook series, which are approved by MOE and aligned to the syllabus. Some schools use school-based worksheets and digital platforms instead of or alongside textbooks.

How is the PSLE Maths paper aligned to the syllabus?

The PSLE Mathematics paper is designed by the Singapore Examinations and Assessment Board (SEAB) based on the syllabus. All questions are drawn from the content specified for each level. No topic outside the syllabus appears in the PSLE. The PSLE tests both procedural fluency (Paper 1) and higher-order problem-solving (Paper 2), reflecting the syllabus's dual emphasis on skills and processes.

My child is in P3. What are the most common syllabus-related challenges at this level?

P3 is often where students first encounter difficulty because of three factors: the introduction of multiplication tables 6–9, equivalent fractions, and formal geometry (angles, perpendicular/parallel lines). Students who have not fully memorised their tables from P2 may struggle. Fifteen minutes of daily table practice in P3 Term 1 can prevent this.

Is Foundation Mathematics a separate syllabus?

Foundation Mathematics is a different paper within the PSLE — it covers the same syllabus topics but at a lower difficulty level and excludes some of the more advanced content (e.g., algebra, circles). The syllabus document is the same; the Foundation version indicates a subset of content and a different examination paper. Students are offered Foundation Mathematics at the recommendation of their school.

Where can I find the syllabus for a specific level?

The official syllabus PDF covers all levels P1–P6 in a single document. Section 5 of the PDF breaks down content by level. Each school also publishes a "Mathematics Department Handbook" or "Subject Briefing" slides at the start of the year, which outline the specific topics, term-by-term sequence, and assessment schedule for that level.

Part 2 — Problem-Solving Methods

Mathematical Heuristics

Singapore Primary Math

In Singapore primary mathematics, students do not just learn to add, subtract, multiply and divide. They learn how to **think** — using structured problem-solving strategies called heuristics. There are 12 heuristics in the MOE syllabus, introduced progressively from Primary 1 to Primary 6. This guide explains all 12, when each is introduced, how it works, and includes original worked examples at every stage.

What Are Heuristics and Why Do They Matter?

A heuristic is a structured problem-solving strategy — a thinking tool, not a formula. When a student encounters a problem that cannot be solved by applying a single operation (like "subtract the smaller number from the larger number"), a heuristic helps them decide what to do instead.

The MOE curriculum embeds heuristics into mathematics teaching from Primary 1. The goal is to develop students who can:

- **Recognise** the type of problem they are facing
- **Select** an appropriate strategy to approach it
- **Apply** the strategy systematically, showing clear working
- **Reflect** on whether the chosen strategy was effective

Heuristics are not optional extras. In the Singapore classroom, every mathematics lesson is a lesson in problem-solving — and every problem-solving lesson draws on one or more heuristics.

Parent tip: When helping your child with homework, try not to jump straight into the numbers. Instead, ask: "What kind of problem is this? What strategy could you use?" This trains the heuristic habit — choosing an approach before calculating.

The 12 Heuristics — Overview

The table below shows all 12 heuristics, when they are typically introduced, and what they are used for.

#	Heuristic	Introduced	Core Idea
1	**Act It Out**	P1	Physically simulate the problem to understand the sequence of events
2	**Draw a Diagram / Bar Model**	P1	Visualise quantities and relationships using pictures or bars
3	**Make a Systematic List**	P2	Organise all possibilities in a structured way to avoid missing any
4	**Look for a Pattern**	P2	Identify a repeating sequence or rule and extend it
5	**Guess and Check**	P3	Make a reasonable estimate, test it, and adjust systematically
6	**Work Backwards**	P3	Start from the known end result and reverse each operation
7	**Restate the Problem**	P3	Rephrase the problem in simpler words to clarify what is being asked
8	**Simplify the Problem**	P4	Replace large numbers with small ones, solve, then apply the same logic

#	Heuristic	Introduced	Core Idea
9	**Solve Part of the Problem**	P4	Break a multi-step problem into smaller sub-problems and solve each in turn
10	**Use Before-After Concept**	P4	Compare a situation before and after a change to identify what stayed constant
11	**Make Supposition (Assumption Method)**	P5	Assume all items are one type, calculate the difference, and adjust — faster than Guess and Check
12	**Use Equations**	P6	Form and solve simple algebraic equations using letter variables

The P1–P6 Heuristics Progression

Heuristics are not taught all at once. They are introduced gradually, with each year adding new strategies while reinforcing earlier ones. Here is the progression by level.

P1 & P2

Act It Out, Draw a Diagram, Make a List, Look for a Pattern

Young students start with concrete, action-based heuristics. They physically act out word problems (e.g. walk across the classroom to model distance) and draw simple diagrams. Making a list helps them organise data before solving. Pattern recognition is introduced through number sequences and shape patterns.

P3

Guess and Check, Work Backwards, Restate the Problem

By P3, students are ready for more structured reasoning. Guess and Check teaches systematic trial. Work Backwards handles problems where the end state is known. Restating the Problem builds comprehension — students learn to say the problem in their own words before solving. For the full P3 topic list and how heuristics fit into the year, see Chapter 6 (Primary 3).

P4

Simplify, Solve Part, Before-After

P4 introduces heuristics for managing harder multi-step problems. Simplifying (replacing large numbers with small ones) builds confidence. Solving a part at a time prevents students from being overwhelmed. Before-After modelling shows what changed and what stayed constant — a skill that becomes essential at P5 and P6.

P5

Assumption Method (Make Supposition)

The Assumption Method is a faster, more structured alternative to Guess and Check. Instead of guessing and adjusting one step at a time, students start with a single assumption (e.g. "assume all 10 vehicles are cars") and calculate the difference in one go. This heuristic is heavily tested in PSLE Paper 2.

P6

Use Equations (Algebra)

In P6, students learn to represent unknowns with letter variables (x, y) and form equations. This is the final heuristic and the formal transition to algebraic reasoning. It does not replace bar models — it complements them. Students who are fluent in bar models often find algebraic equations easier to grasp because the "1u" unit notation is conceptually identical to "x".

All 12 Heuristics — Explained with Worked Examples

1. Act It Out

Introduced: P1 · **When to use:** The problem describes a sequence of events or a physical action that can be recreated.

Students physically act out the problem using themselves, objects, or movements. This is the most concrete heuristic and the first one taught, because it requires no abstract reasoning — just observation and counting.

Worked Example — P1/P2 Level

5 children are on a bus. 2 more children get on. How many children are on the bus now?

```
Act it out: Have 5 children (use counters or volunteers). Bring in 2 more. Count them together.
Answer: 7 children
```

```
Why it works: Acting out removes the abstraction from word problems. A child who cannot yet read fluently can solve by watching and counting. This builds confidence before formal written methods are required.
```

```
2. Draw a Diagram / Bar Model
```

```
Introduced: P1 · When to use: The problem involves quantities and their relationships — especially addition, subtraction, comparison, fractions, ratios, or percentages.
```

```
A diagram, most commonly a bar model, turns abstract quantities into visual bars that students can label and compare. This is the most widely used heuristic in Singapore primary mathematics and the foundation of the CPA approach.
```

Worked Example — P3/P4 Level

Mia has 24 stickers. She has 3 times as many stickers as her brother Leo. How many stickers does Leo have?

```
Draw a bar model:
Leo: [ 1 unit ]
Mia: [ 1 unit ][ 1 unit ][ 1 unit ] = 24
3 units = 24 → 1 unit = 8
Answer: Leo has 8 stickers
```

```
3. Make a Systematic List
```

```
Introduced: P2 · When to use: The problem asks for all possible combinations, arrangements, or outcomes.
```

```
Students organise all possibilities in a structured table or list. This prevents them from missing options or double-counting. It is especially useful for combinatorics-style problems and logic puzzles.
```

Worked Example — P2/P3 Level

Ali has a red shirt, a blue shirt, and a white shirt. He has black shorts and grey shorts. How many different outfits can he make?

```
Make a systematic list:
Red + Black · Red + Grey
Blue + Black · Blue + Grey
White + Black · White + Grey
Answer: 6 different outfits4. Look for a Pattern
```

Introduced: P2 · When to use: The problem contains a sequence or repeating structure that can be identified and extended.

Pattern recognition is a foundational mathematical skill. Students learn to observe how a sequence changes from one term to the next and use that rule to predict later terms. This heuristic connects to algebra (finding the nth term) in later years.

Worked Example — P3/P4 Level

What is the 10th shape in the pattern: triangle, circle, triangle, circle, triangle, circle, …?

```
Look for a pattern:
Position 1: triangle · Position 2: circle · Position 3: triangle · Position 4: circle
Alternating pattern: odd positions = triangle, even positions = circle
Position 10 is even → circle5. Guess and Check
```

Introduced: P3 · When to use: The problem has two or more unknown values that satisfy given conditions, and solving directly is difficult.

Students make a reasonable first guess, check it against the conditions, and refine systematically. The key is organisation — recording each guess in a table prevents random trial and lets the student see how close each guess is.

Worked Example — P3/P4 Level

A farmer has 5 animals. Some are chickens (2 legs each) and some are goats (4 legs each). There are 16 legs in total. How many goats are there?

```
Guess and Check (table):
Guess 1: 3 chickens, 2 goats → 3×2 + 2×4 = 14 legs (too few)
Guess 2: 2 chickens, 3 goats → 2×2 + 3×4 = 16 legs
Answer: 3 goats■6. Work Backwards
```

Introduced: P3 · When to use: The problem gives the final result and a sequence of operations, and you need to find the starting value.

Students start from the known result and reverse each operation — addition becomes subtraction, multiplication becomes division. This heuristic is common in money and age problems.

Worked Example — P4/P5 Level

Ben had some money. He spent $8 on lunch, then earned $15 walking his neighbour's dog. He now has $32. How much did he start with?

```
Work backwards from the end:
End: $32
Before earning $15: $32 - $15 = $17
Before spending $8: $17 + $8 = $25
Answer: Ben started with $257. Restate the Problem
```

Introduced: P3 · When to use: The problem wording is confusing, multi-layered, or contains unnecessary information that needs to be stripped away.

Students paraphrase the problem in simpler language, focusing on what is known and what is being asked. This heuristic is closely linked to reading comprehension — a student who cannot restate the problem accurately will struggle to solve it.

Worked Example — P3/P4 Level

"Mrs Tan has 3 times as many red balloons as blue balloons. After she uses 8 red balloons for a party, she has 22 red balloons left. How many blue balloons does she have?"

Restate: "Mrs Tan's red balloons = 3 × blue balloons. She had some red balloons, used 8, and now has 22 left. Find the number of blue balloons."
Red balloons before = 22 + 8 = 30
Blue balloons = 30 ÷ 3 = 10 blue balloons8. Simplify the Problem

Introduced: P4 · When to use: The numbers are large or the problem structure is complex, and reducing to a simpler case helps reveal the approach.

Students replace large numbers with smaller ones (e.g. change 468 to 4), solve the simpler problem, then apply the same reasoning to the original. This is especially useful for problem types where the arithmetic obscures the structure.

Worked Example — P4/P5 Level

A hall has 468 chairs arranged in rows. Each row has 12 chairs. How many rows are there?

Simplify first: If there were 24 chairs in rows of 6, rows = 24 ÷ 6 = 4.
Same structure: rows = total ÷ chairs per row
468 ÷ 12 = 39 rows9. Solve Part of the Problem

Introduced: P4 · When to use: The problem contains multiple steps or conditions, and solving a sub-step first makes the remainder clearer.

Students identify what they can find right away with the given information, solve that part, and use the result to unlock the next step. This is the heuristic that underlies all multi-step problem solving.

Worked Example — P4/P5 Level

A shop had 120 apples. It sold 45 apples in the morning and 38 apples in the afternoon. How many apples were not sold?

Solve part by part:
Step 1: Apples sold in total = 45 + 38 = 83
Step 2: Apples not sold = 120 - 83 = 37 apples■10. Use Before-After Concept

Introduced: P4 · When to use: A quantity changes — something is added, removed, transferred, or changed, and you need to compare the situation before and after.

Students draw (or imagine) two scenarios: before the change and after the change. They identify what stayed the same (the constant) — often the total, a difference, or a ratio. This heuristic is especially important for P5 and P6 problems.

Worked Example — P5 Level

Ali and Bala had the same amount of money. After Ali spent $28 and Bala spent $12, Bala had 3 times as much money as Ali. How much did each start with?

Before: Ali [─────], Bala [─────] (same)
After: Ali [─$28─][?], Bala [─$12─][?]
Difference after = $28 - $12 = $16
Bala's after amount = 3 units, Ali's after = 1 unit
Difference = 2 units = $16 → 1 unit = $8
Ali's after = $8, so Ali started with $8 + $28 = $36
(Check: Bala after = $24, Bala started $24 + $12 = $36)
11. Make Supposition (Assumption Method)

```
Introduced: P5 · When to use: A problem involves two different types of items with
different values, and you need to find how many of each type there are.
```

```
This is an advanced heuristic that replaces Guess and Check. Instead of making repeated
guesses, students assume all items are of one type, calculate the "excess" or
"shortfall," and adjust in a single step.
```

Worked Example — P5/P6 Level

A carpark has 10 vehicles. Some are cars (4 wheels) and some are motorcycles (2 wheels). There are 32 wheels in total. How many cars are there?

```
Assume all are motorcycles: 10 × 2 = 20 wheels
Shortfall = 32 - 20 = 12 wheels
Each car has 2 more wheels than a motorcycle
Number of cars = 12 ÷ 2 = 6 cars
(Check: 6 cars + 4 motorcycles = 10 vehicles, 6×4 + 4×2 = 32 wheels )
```

```
12. Use Equations (Algebra)
```

```
Introduced: P6 · When to use: The problem involves unknown quantities that can be
represented by variables, and forming an equation simplifies the solution.
```

```
P6 students learn to represent unknowns with letters (x, y) and write equations. The
bar model notation of "1u" naturally leads to "x". Students still use bar models
alongside equations — the two approaches reinforce each other.
```

Worked Example — P6 Level

A book and a pen cost $15 together. The book costs $9 more than the pen. Find the cost of the book.

```
Let the pen cost x dollars.
Book costs x + 9 dollars.
x + (x + 9) = 15
2x + 9 = 15 → 2x = 6 → x = 3
Book = 3 + 9 = $12
```

```
Parent note: Many parents educated outside Singapore worry that their child is "behind"
because algebra is introduced so late. In the Singapore system, delaying formal algebra
is deliberate — the bar model and unit notation (1u) serve the same purpose visually,
and students who master them tend to transition to algebraic thinking with deeper
understanding.
```

How to Help Your Child Choose the Right Heuristic

Knowing 12 strategies is one thing. Knowing **which one to use** is the skill that develops with practice. Here is a simple decision guide parents can use when working through homework with their child.

If the problem involves...	Try this heuristic
A physical action or sequence	**Act It Out**
Quantities that need comparing or relating	**Draw a Diagram / Bar Model**
All possible combinations or arrangements	**Make a Systematic List**
A sequence, repetition, or rule	**Look for a Pattern**
Two unknown values and conditions to satisfy	**Guess and Check** or **Make Supposition**
A known end result with a series of steps	**Work Backwards**
Confusing wording or many numbers	**Restate the Problem** or **Simplify**

If the problem involves…	Try this heuristic
Multiple steps and sub-questions	**Solve Part of the Problem**
A change from one situation to another	**Use Before-After Concept**
Unknown values and you can form an equation	**Use Equations**

Common parent mistake: Telling your child which heuristic to use before they try to figure it out themselves. The most valuable part of heuristics education is the *selection* step — letting the child decide (and sometimes choose wrong) builds metacognition. If the first strategy does not work, ask: "What else could you try?"

Are heuristics the same as problem-solving steps?

Not exactly. Problem-solving steps (like the four-step Polya process — Understand, Plan, Solve, Check) describe a general approach. Heuristics are the specific strategies used within the "Plan" step. Think of problem-solving steps as the overall route and heuristics as the tools you use along the way.

Does my child need to memorise all 12 heuristics?

No. The goal is not to memorise names but to develop the habit of choosing an appropriate strategy when faced with an unfamiliar problem. Most students naturally internalise the heuristics they use most often — Draw a Diagram, Guess and Check, Work Backwards, and Before-After are the most frequently used.

What if my child only uses one heuristic (like Guess and Check) for everything?

This is common, especially among P3 and P4 students. Guess and Check is reliable but slow for many problem types. Encourage variety by asking: "Could you solve this with a bar model instead?" or "What if you worked backwards?" Showing that Guess and Check takes longer than a more efficient strategy builds motivation to learn the others.

Parent tip: When helping your child with homework, try not to jump straight into the numbers. Instead, ask: “What kind of problem is this? What strategy could you use?” This trains the heuristic habit — choosing an approach before calculating.

Bar Models

Singapore Primary Math

The bar model is the most recognised feature of Singapore Mathematics — and one of the most misunderstood. It is not a trick or a worksheet exercise. It is a structured way to make abstract quantities visible, and it works for students at every primary level, from simple addition in P1 to multi-step ratio problems in P6. This guide explains how it works, when to use each model type, and how to support your child's drawing at home.

Why Bar Models — Not Just for the PSLE

Many parents first encounter the bar model when helping their P5 or P6 child prepare for the PSLE. But bar models are introduced in Singapore schools as early as Primary 1, and the reason is deliberate: they are the **Pictorial** stage of the Concrete-Pictorial-Abstract (CPA) learning progression that underpins the entire Singapore Math curriculum.

Concrete

Physical objects — counters, cubes, fraction strips — represent numbers in the real world.

Pictorial

Diagrams — especially bar models — represent quantities and relationships visually.

Abstract

Symbols, equations, and eventually algebra represent the same ideas without pictures.

The bar model is the bridge between handling real objects and writing equations. A child who can draw and label a bar model correctly has already done most of the mathematical thinking. The arithmetic that follows is secondary.

This is why the bar model is used internationally — by homeschool families in the United States, international schools in Europe and Australia, and families relocating to Singapore who are new to the method. The underlying skill being developed — representing relationships visually before solving — transfers well beyond the Singapore school system.

The Three Core Bar Model Types

There are three main bar model structures in Singapore primary mathematics. Each suits a different class of problem. Students learn to recognise which type fits a question before they start drawing.

Model Type 1: Part-Whole

What it shows: How two or more parts combine to make a total (the whole). It is the foundational model, introduced in P1.

Use it when: The question involves a total and its parts, and asks for a missing part or the whole. Keywords: "altogether", "total", "in all", "how many more to make…"

```
Whole = 60
[ Part A = 24 ][ Part B = ? ]
```

If Part A = 24 and the Whole = 60, then Part B = 60 - 24 = 36. The bar makes the missing piece obvious.

Worked Example — P1/P2 Level

There are 48 apples in a basket. 19 are red. The rest are green. How many green apples are there?

```
Draw: [19 — Red] + [? — Green] = [48 — Total]
Green apples = 48 - 19 = 29 applesModel Type 2: Comparison

What it shows: The difference between two (or more) quantities, drawn as bars of
different lengths placed one above the other.

Use it when: The question compares two people, groups, or quantities. Keywords: "more
than", "less than", "times as many", "fewer", "how many more/fewer".

Ali: [##########] 5 units
Bala: [######] 3 units
^ difference = 2 units

The empty dashed block shows the difference. If Ali has 5 units and Bala has 3 units,
the difference is 2 units. Label each unit with its value and you have the answer.
```

Worked Example — P3/P4 Level

Mia saved $135. She saved $47 more than her brother Jake. How much did Jake save?

```
Draw: Mia [ ——————————— ] = $135
Jake [ ————————— ][ $47 ] = same total bar
Jake's savings = $135 - $47 = $88Worked Example — "Times as many" (P4/P5 Level)

A box of mangoes weighs 3 times as much as a box of limes. Together they weigh 56 kg.
How much does the box of limes weigh?

Draw: Limes [1u]
Mangoes [1u][1u][1u]
Total = 4 units = 56 kg
→ 1 unit = 56 ÷ 4 = 14 kg
The box of limes weighs 14 kg.
Model Type 3: Fraction & Ratio

What it shows: A bar divided into equal units to represent fractions, ratios, or
percentages. This is the most powerful model type for upper primary students.

Use it when: The question involves fractions of a quantity, ratios between two groups,
or percentage change. Keywords: "fraction of", "ratio of", "what fraction is…", "2 :
3".

[1u][1u] given away + [1u][1u][1u] remaining
= 5 units in total

Each equal-width segment = 1 unit. Label known values, find the value of 1 unit, then
answer the question using the relevant unit count.
```

Worked Example — Fraction (P4/P5 Level)

Priya spent 2/5 of her pocket money on a book. She had $36 left. How much pocket money did she start with?

```
Draw 5 equal units:
[1u][1u] = spent on book
[1u][1u][1u] = $36 remaining
3 units = $36 → 1 unit = $12
Total = 5 units = 5 × $12 = $60Worked Example — Ratio (P5/P6 Level)

The ratio of boys to girls in a class is 3 : 4. There are 12 boys. How many students
are there in total?

Draw: Boys [1u][1u][1u] = 12
Girls [1u][1u][1u][1u]
```

```
3 units = 12 → 1 unit = 4
Total students = 7 units = 7 × 4 = 28 students
```

When Each Model Type Is Introduced (P1 to P6)

Bar model drawing is developed gradually. Understanding which model a student should already know helps parents provide the right support without introducing concepts too early.

P1 & P2

Part-Whole with small numbers

Students draw simple two-part bars for addition and subtraction problems within 100. The bar is often drawn freehand; precision matters less than the concept. Labels are single numbers.

P3

Comparison models introduced

Students begin drawing bars of different lengths to show "more than" and "fewer than" relationships. Multiplication and division are introduced; some students begin using unit notation ("1u") for equal groups.

P4

Fraction and multi-step models

Bar models are divided into equal units to represent fractions of a set. Two-step problems require two different model diagrams or combined models. Accuracy in proportional drawing becomes more important.

P5

Ratio models; before-and-after

Ratio problems require the student to equate unit values across two bars. Before-and-after models show a situation before and after a change (transfer, addition, or removal) — a structure that replaces the need for simultaneous equations. Ratio and before-after problems are the defining skills of the P5 year — see Chapter 8 (Primary 5) for what else it introduces.

P6

Combined models; algebra bridge

Advanced P6 problems often combine fractions, ratios, and percentages in a single question. Students draw multi-section bars and may need to equalise units across two scenarios. The "1u" notation is effectively a visual form of algebra — preparation for the formal variable introduced in P6.

Five Rules for Drawing Bar Models Correctly

These rules apply at every level, from P1 to P6. Students who follow them produce cleaner diagrams and make fewer errors.

- **Use a pencil and ruler.** Straight lines make proportions clearer and mistakes erasable. Freehand bars at P4+ introduce proportion errors that mislead the student.
- **Keep bars of equal units the same width.** If 1 unit = 1 segment width, then 3 units must be exactly 3 times as wide. Disproportionate drawing creates confusion when checking the answer.

- **Label every part.** Write the known value inside (or above) each bar segment. Write a "?" in any segment that is the unknown. Never leave a segment unlabelled.
- **Write the total or relationship outside.** Use a curly brace or bracket to indicate what the full bar represents. Write the total value beside it.
- **Start with the unit you know, not the one you want.** Draw the bar whose value is given first. Then draw the second bar relative to the first. Working in the opposite direction is the most common student mistake.

Tip for parents: If your child draws a bar model and gets confused, ask them to point to each segment and say what it represents aloud. If they cannot explain each part in words, the diagram is not yet doing its job. The drawing should match the sentence structure of the question.

Common Bar Model Mistakes — and How to Fix Them

Mistake: Drawing proportionally wrong bars

A bar for "3 times as many" drawn at the same size as the reference bar. The visual no longer represents the relationship.

Fix: Estimate proportions deliberately

Before drawing, ask: "Is the bigger bar 2× or 3× the smaller one?" Sketch lightly first, then firm up with a ruler once the proportion looks right.

Mistake: Skipping the diagram for "simple" problems

Students who skip bar models on P4 problems often make errors on P5–P6 problems where they must now draw under pressure with unfamiliar structures.

Fix: Draw even when you think you don't need to

The bar model builds a mental habit. Students who draw routinely at P4 find P5 diagrams less intimidating because the process is automatic.

Mistake: Mixing up the whole and the part

After finding 1 unit, the student answers with "1 unit" instead of the relevant multiple. They found the part but answered with the value of the wrong segment.

Fix: Re-read the question after solving

Circle the exact question being asked before drawing. After finding 1 unit, go back and check: "Did the question ask for 1 unit, 3 units, or the total?"

Mistake: Using letters instead of unit notation

Writing "x" instead of "1u" introduces formal algebra before students are ready and causes confusion with the P6 algebra syllabus.

Fix: Stay with "1u" notation until P6 algebra

Unit notation ("1u, 2u, 3u") is the Singapore primary standard. It naturally bridges to algebra in P6 without conflicting with it.

Bar Models and Algebra: How They Connect

A frequent question from parents — especially those from educational systems that introduced algebra earlier — is: "Why draw bars instead of just writing an equation?"

The answer is developmental. Research in mathematics education (and the experience of Singapore teachers since the 1980s) shows that students who build visual understanding of unknown quantities are better equipped to handle formal algebra later. The label "1u" in a bar model is conceptually the same as "x" in an equation — but a 9-year-old can reason about a labelled box far more intuitively than about a letter variable.

When formal algebra is introduced in P6 (and extended in secondary school), students who are fluent bar model drawers tend to transition more easily. The bar model has already trained them to think: "There is something I don't know. I can represent it. I can find its value by using what I do know."

Note for parents from other countries: If you are used to teaching your child to set up equations immediately, you may find the bar model method feels slower. It is not. For the types of word problems in the Singapore primary curriculum — especially ratio and fraction problems — a well-drawn bar model often produces the solution with far less algebraic manipulation than the equation approach would require at this level.

How to Support Bar Model Drawing at Home

You do not need to be a mathematics teacher to help your child with bar models. The following approach works well for parents at any confidence level.

- **Read the question together** and underline the numbers and the key words ("more than", "fraction of", "ratio"). Ask: "How many things are being compared?"
- **Ask which model type fits.** "Is this a part-whole question, a comparison question, or a fraction/ratio question?" Let your child decide. Prompt if needed but resist telling them the answer.
- **Watch the drawing, not just the arithmetic.** If the bar diagram is wrong, the arithmetic will almost certainly be wrong too. Correct the diagram before looking at the numbers.
- **Check by substituting back.** Once an answer is found, replace the unknown in the original problem with the answer and verify the problem statement is satisfied. This habit catches errors at every level.

Quick home practice idea: Take any simple division problem from daily life — sharing items equally, splitting a bill — and ask your child to draw a bar model for it before solving. Five minutes a day of this builds the drawing habit faster than any worksheet.

My child is in P3 and has never drawn a bar model. Is it too late to start?

No. P3 is actually an ideal time to build the habit, because the numbers are still manageable and the question structures are not yet too complex. Start with simple Part-Whole diagrams using P3-level numbers. Once the habit is established, introduce Comparison models.

Should the bars be drawn to scale?

They should be proportionally reasonable — a bar representing 3 units should look roughly 3 times as long as one representing 1 unit. They do not need to be perfectly to scale, but wildly disproportionate bars create misleading visuals that confuse the student. A quick rough sketch is fine as long as relative sizes are clear.

What is the difference between the Part-Whole and the Comparison model?

In the Part-Whole model, the bars are placed end-to-end to form a complete whole. In the Comparison model, the bars are placed one above the other and the difference between them is highlighted. The choice depends on whether the question is about a total (Part-Whole) or a difference (Comparison).

Word Problems

Singapore Primary Math

Word problems are not a separate type of mathematics. They are regular mathematics — addition, subtraction, multiplication, division, fractions, ratios — wrapped in language. The difficulty is not the arithmetic; it is figuring out **which** arithmetic to use and in what order. This guide teaches a repeatable 4-step process that works for any Singapore Math word problem, from Primary 1 to Primary 6.

Why Word Problems Are Hard (and Why They Matter)

Many parents tell us: "My child can do the calculations but keeps getting word problems wrong." This is because word problems test a different skill — not arithmetic, but **problem-solving**. The student must:

- Read a paragraph of text and extract the relevant numbers
- Understand how those numbers relate to each other
- Identify what is being asked (which is often not the most obvious calculation)
- Choose a strategy that fits the problem type
- Execute the arithmetic correctly and check the answer against the original question

In Singapore primary mathematics, word problems are the main way students develop mathematical thinking. The MOE curriculum places "Mathematical Problem Solving" at the centre of the Pentagon Framework. From P1 onwards, students are expected to solve problems — not just compute answers.

The 4-Step Problem-Solving Process (UPDC)

Singapore schools teach a structured process based on Polya's four-step model, adapted as **UPDC** — Understand, Plan, Do, Check. Teaching your child to follow these steps in order prevents the most common mistake: jumping straight to calculations.

Step 1 – Understand

Read the problem carefully. Identify what is given (the known values) and what is being asked (the unknown). Underline key numbers and keywords. Draw a simple diagram or bar model to visualise the relationship.

Ask: "What do I know? What do I need to find?"2

Plan

Choose a strategy that fits the problem type. Will you draw a bar model? Work backwards? Guess and check? Look for a pattern? The right strategy depends on the relationship between the quantities — not just the keywords.

Ask: "What kind of problem is this? Which strategy fits?"3

Do (Solve)

Carry out the plan step by step. Show all working clearly — do not skip steps even if the arithmetic is simple. Label all numbers and units. Write the final answer as a complete sentence.

Ask: "Am I working step by step? Are my units correct?"4

Check

Read the question again and verify that your answer satisfies the original conditions. Does the answer make sense in context? Can you reverse the operations to confirm? If possible, estimate the expected range first, then check.

Ask: "Does my answer fit the question? Is it reasonable?"

Parent tip: When your child is practising, ask them to say which step they are on before they do anything. "I am on Step 1 — I am reading." This builds metacognition and slows down the rush-to-solve habit that causes most word problem errors.

Keyword Identification: What Those Words Actually Mean

Keywords are useful clues — but they are not rules. A good Singapore Math student uses keywords as a starting point, then verifies the operation by thinking about the **relationship** between quantities. Here is a guide to common keywords and the problem types they suggest.

Keyword / Phrase	Likely Problem Type	Strategy to Try	Note for Parents
altogether, in all, total	Part-Whole	Draw a Part-Whole bar model	Usually addition — but check if one part is missing
more than, less than, fewer	Comparison	Draw a Comparison bar model	'More than' can mean subtract (find the smaller quantity) — be careful
times as many, as much as, twice	Comparison (multiplicative)	Comparison model with units	The keyword tells you the ratio — draw equal units, not a longer bar
how many more, how much less	Difference	Comparison model showing the gap	The answer is the difference, not the larger or smaller value
left, remaining, how many left	Part-Whole (missing part)	Part-Whole bar model	Subtract the used/removed amount from the total
each, every, per, share equally	Multiplication or Division	Equal-groups bar model	Determine whether you know the total (multiply) or need the total (multiply the unit by the count)
fraction of, 1/2 of, 3/4 of	Fraction of a quantity	Fraction bar model (equal units)	Draw equal units first, then label the fraction
ratio, : , in the ratio of	Ratio	Ratio bar model (units for each group)	Each part of the ratio is one unit — find 1 unit first
at first, after, in the end	Before-After	Before-After bar model	Identify what stayed constant (total, difference, or ratio)
how many more/fewer are needed	Comparison / Remainder	Comparison model or bar model with missing part	This is often a two-step problem: find the current amount, then find the difference

Important: Do not let your child rely only on keywords. A student who always adds when they see "altogether" will get confused when the problem says "altogether, how many more..." (which requires subtraction). Teach them to read the whole sentence and check: "Does the operation I am about to use make sense in this situation?"

Choosing the Right Strategy

Once the student understands the problem, the next step is choosing a strategy. Here is a quick guide for the most common word problem types in Singapore primary mathematics.

Problem Type	Best Strategy	When Introduced
Two or more quantities combine into a total	Part-Whole bar model	P1
Compare two quantities (more / less / times)	Comparison bar model	P2–P3
Fraction or ratio of a quantity	Fraction / Ratio bar model	P4
Sequence, pattern, or repeating rule	Look for a Pattern	P2–P3
Known end result, unknown starting point	Work Backwards	P3
Two unknown values with conditions	Guess and Check or Assumption Method	P3 / P5
Change from one situation to another	Before-After bar model	P4–P5
Large numbers obscuring the structure	Simplify the Problem	P4
Multi-step with sub-questions	Solve Part of the Problem	P4
Unknown represented by a variable	Use Equations (Algebra)	P6

Worked Examples — Applying the 4-Step Process

The examples below show the full UPDC process at three difficulty levels. Notice how the process stays the same even as the problems become harder.

Example A — P3 Level: Part-Whole

Worked Example: P3 Level

Ali has 38 stamps. His sister gives him 25 more stamps. How many stamps does Ali have now?

1. Understand: Given = 38 stamps (starting), 25 stamps (added). Find = total stamps now.
2. Plan: Part-Whole bar model. The two parts add up to the whole.
3. Do: 38 + 25 = 63 stamps.
4. Check: 63 - 25 = 38 . The answer makes sense. Ali started with 38 and got more, so the total should be larger.

Answer: Ali has 63 stamps.

Example B — P5 Level: Before-After with Fractions

Worked Example: P5 Level

Mrs Tan had a bag of oranges. She sold 3/5 of the oranges in the morning and 12 oranges in the afternoon. She had 8 oranges left. How many oranges did she have at first?

1. Understand: Sold 3/5 in morning, then 12 in afternoon. 8 left. Find = starting amount.
2. Plan: Draw a fraction bar model (5 equal units). Sold = 3 units in morning. Then sold 12 more. Left = 8. Remaining after morning = 2 units = 12 + 8 = 20.
3. Do: 2 units = 20 → 1 unit = 10. Total = 5 units = 5 × 10 = 50.
4. Check: Started with 50. Sold 3/5 = 30, left 20. Sold 12 more, left 8 .

Answer: Mrs Tan had 50 oranges at first.

Example C — P6 Level: Ratio and Before-After

Worked Example: P6 Level

The ratio of Ali's money to Bala's money was 4 : 3. After Ali gave Bala $24, the ratio became 1 : 2. How much money did Ali have at first?

```
1. Understand: Before ratio 4:3 (Ali:Bala). After transfer of $24, ratio becomes 1:2.
The total stays the same.
2. Plan: Before-After model. Total units before = 7. Total units after = 3. Since total
is constant, find a common total (LCM of 7 and 3 = 21). Before = 12:9 (multiply by 3).
After = 7:14 (multiply by 7).
3. Do: Ali's change: from 12 units to 7 units = 5 units lost = $24. 1 unit = $24 ÷ 5 =
$4.80. Ali's before amount = 12 units × $4.80 = $57.60.
4. Check: Ali before $57.60, Bala before $43.20 (total $100.80). After: Ali $33.60,
Bala $67.20. Ratio 33.60:67.20 = 1:2 .
Answer: Ali had $57.60 at first.

This before-after ratio problem is typical of the final primary year — see the Primary
6 Maths guide for everything the P6 year covers.
```

Four Common Word Problem Mistakes — and How to Fix Them

Mistake: Solving before understanding

Seeing numbers and keywords and jumping straight to calculations. Often results in the wrong operation — or solving for the right number but answering the wrong question.

Fix: Underline the question first

Before writing any number, underline the exact sentence that asks the question. Then identify the unknown. Only start calculating after you can say: "I am trying to find ______."

Mistake: Over-relying on keywords

Seeing 'more than' and adding; seeing 'left' and subtracting — without checking whether the operation makes sense in context.

Fix: Draw a relationship diagram

Before deciding the operation, draw a simple bar model or write a relationship sentence. The visual will show whether 'more than' means adding to find the total or subtracting to find the smaller quantity.

Mistake: Ignoring units and labels

Writing '24' instead of '24 cm' or '24 apples'. This causes errors in multi-step problems where units must be tracked through each step.

Fix: Write the unit with every number

Every number in the working should have a unit — kg, cm, dollars, stickers. If the units do not match across steps, that signals a conversion or addition error.

Mistake: Skipping the final check

Stopping as soon as a number appears. Many 'careless' mistakes are caught by a 10-second reasonableness check.

Fix: Use the 'Reverse Check'

Take your answer and plug it back into the original problem. Reverse the operations. Does it match the given numbers? Also ask: "Is this answer realistic?" (A student cannot have -5 stickers.)

Weekly practice idea: Choose 3 word problems per week and have your child write only the UPDC labels (Understand, Plan, Do, Check) with a brief note under each — without doing the arithmetic. This builds the process habit without the pressure of getting the right answer.

Mistake: Is Singapore Math harder than other math curricula because of word problems?

Not exactly. Singapore Math covers broadly the same arithmetic topics as other curricula. What makes it different is the emphasis on problem-solving — students must apply arithmetic in unfamiliar contexts, not just repeat practised calculations. This is harder in the short term but builds deeper understanding that serves students well in secondary school.

Mistake: Should my child draw a bar model for every word problem?

In the early years (P1–P3), yes — drawing bar models builds the visual thinking habit. By P4–P5, many students can solve simple problems without a diagram but should still draw for any problem with multi-step or fraction components (and for ratio from P6). By P6, the goal is to choose: draw a bar model for complex problems, use algebra for problems involving unknown variables, and skip the diagram only for very straightforward questions.

Mistake: My child understands the process but makes 'careless' mistakes. What should I do?

True careless mistakes are rare. Most errors classified as 'careless' are actually procedure errors — working too fast, skipping steps, or losing track of units. The fix is to slow down and use the UPDC process explicitly for every problem, even easy ones. For 10 minutes a day, have your child solve one word problem using the full 4-step written process. Speed comes after accuracy.

Part 3 — Primary 1 to 6

Primary 1 and 2

Singapore Primary Math

Primary 1 and 2 provide the foundational years for developing core number sense in Singapore's mathematics system. These years follow the Concrete-Pictorial-Abstract (CPA) approach — developed from Jerome Bruner's research — and lay the foundation for all later success. This guide covers the P1 and P2 syllabus, the CPA method, and how parents can support early mathematical development at home.

P1 and P2 Syllabus Overview

The lower primary syllabus is designed around the CPA approach. Every topic progresses from concrete manipulatives to pictorial representations to abstract symbols.

Primary 1 Maths Topics

1

Numbers to 100

Counting, reading, writing, comparing, and ordering numbers up to 100; place value (tens and ones)

Addition & Subtraction

Addition and subtraction within 100; number bonds; fact families; using part-whole bar models

Money

Counting money in cents up to $1 and in dollars up to $100; comparing amounts of money

Length

Measuring length in centimetres (cm); comparing and ordering lengths in cm

Time

Telling time to 5 minutes; using am and pm; duration of one hour and half hour

2D Shapes

Identifying and describing 2D shapes (square, rectangle, triangle, circle, half and quarter circle)

Primary 2 Maths Topics

Numbers to 1000

Place value (hundreds, tens, ones); comparing and ordering; number patterns

Multiplying & Dividing

Multiplication tables of 2, 3, 4, 5 and 10; multiplying and dividing within the tables; using × and ÷ symbols

Fractions

Fraction of a whole (1/2, 1/4, 2/4, 3/4); comparing and ordering unit and like fractions

Length & Mass

Measuring length in metres (m); mass in kilograms and grams (kg, g); volume of liquid in litres

■

Time (to the minute)

Telling time to the minute; converting between hours and minutes

Picture Graphs

Reading and interpreting picture graphs with scales; drawing conclusions from data

■

3D Shapes

Identifying, naming and classifying 3D shapes (cube, cuboid, cone, cylinder, sphere)

The CPA Approach: Why It Matters

The CPA (Concrete-Pictorial-Abstract) approach is the pedagogical backbone of Singapore Math. In P1 and P2, it works like this:

- **Concrete.** Students use physical objects — counters, base-ten blocks, interlocking cubes, play money — to explore a concept. For example, adding 8 + 5 by counting real counters, then grouping to make 10.
- **Pictorial.** Students draw or look at representations — number bonds, bar models, number lines. For example, drawing a number bond showing 10 made of 8 and 2.
- **Abstract.** Students use numbers and symbols: 8 + 5 = 13.

Why this matters: A thorough grounding in the CPA progression during Primary 1 and 2 helps students develop intuitive number sense and approach multi-step problems with greater confidence. Do *not* skip the concrete stage — it builds the mental models that make later mathematics intuitive.

What Parents Can Do at Home

- **Count everything.** While shopping, ask "How many apples are in the bag?" During dinner, "How many plates do we need?" — counting in everyday contexts builds number sense naturally.
- **Use number bonds.** The number bond is the core mental model of Singapore Math. Ask "What two numbers make 10?" repeatedly and in different contexts (fingers, coins, counters).
- **Avoid rushing to worksheets.** If your child cannot solve 8 + 5 with counters, they are not ready to solve it with symbols. Each CPA stage must be mastered before the next.
- **Tell time together.** An analogue clock (not digital!) on the wall helps children internalise the cyclic nature of time. Ask "What time is dinner?" and "How many minutes until we leave?"
- **Pay with cash.** Let your child count coins and calculate change. Money is one of the best real-world contexts for practicing addition, subtraction, and place value.

A P1–P2 Level Worked Example

Here is a simple addition problem that uses the make-10 strategy — a core mental math skill taught in P1 and P2.

Worked Example — P1/P2 Level

Sarah has 8 red balloons and 5 blue balloons. How many balloons does she have altogether?

```
Step 1 — Make 10:
Take 2 from the 5 blue balloons to make 8 + 2 = 10.
Step 2 — Add the remainder:
10 + 3 = 13
Answer: Sarah has 13 balloons.
```

```
Teaching tip: Use real objects (counters, buttons, or even Lego bricks) when practising
this at home. Have your child physically group the 8 and 2 together to make 10, then
add the remaining 3. This concrete experience is the CPA approach in action — it builds
the mental model that makes addition automatic by P3.
```

My P1 child is still counting on fingers. Is this OK?

```
Yes — finger counting in P1 is developmentally appropriate. The concern is if a child
is still relying on finger counting for sums within 10 by the end of P2. Encourage
number bond practice (especially making 10) to build automaticity.
```

Should I start teaching multiplication tables in P1?

```
No. The MOE syllabus introduces multiplication as repeated addition in P2 only
(beginning of P2). Before then, focus on number sense — counting, number bonds, and
addition/subtraction facts within 20. A child who understands number bonds deeply will
learn multiplication tables much faster when they are introduced.
```

What is the biggest mistake parents make in P1–P2 maths?

```
Rushing to written worksheets without enough concrete experience. The CPA approach has
strong research backing — the concrete stage is not optional. A child who understands
maths conceptually in P1–P2 will be more resilient when the difficulty increases in P4
and P5.
```

Supporting your child — foundation stage

- **Count everything.** Count stairs, spoons, toys. The more real-world counting children do, the stronger their number sense becomes.
- **Use physical objects.** When the syllabus mentions "concrete learning," it means counters, buttons, and blocks. Let your child touch and move objects before writing numbers.
- **Practise number bonds.** Number bonds to 10 (e.g., 3 + 7 = 10) are an essential foundation skill. Master them and addition/subtraction becomes far easier.
- **Read the time and handle money.** These are syllabus requirements, not extras. A simple pocket-money routine teaches counting, addition, subtraction, and decimal readiness.

Primary 3

Singapore Primary Math

Primary 3 is a transition year in Singapore primary mathematics. It is when formal heuristics are introduced, word problems become multi-step, and students move from concrete to pictorial understanding. P3 is also when multiplication tables 6–9, equivalent fractions, area and perimeter, and geometry fundamentals enter the curriculum. This guide covers the P3 syllabus and how to help your child build confidence for upper primary.

The P3 Mathematics Syllabus

P3 introduces several foundational topics that set the stage for the broadening of P4 and the difficulty jump of P5. Each new topic is introduced using the CPA (Concrete-Pictorial-Abstract) approach.

Multiplication & Division

Multiplication tables 6, 7, 8 and 9; division of numbers up to 3 digits by 1 digit; mental calculation strategies

Fractions

Equivalent fractions; expressing a fraction in its simplest form; adding and subtracting two related fractions

Length, Mass & Volume

Kilometres (km), litres (l) and millilitres (ml), measurement conversion within the same system

Time

24-hour clock, duration and elapsed time, converting between 12-hour and 24-hour formats

Angles

Identifying right, acute and obtuse angles; comparing angles by size

Perpendicular & Parallel Lines

Identifying and drawing perpendicular and parallel lines

Area & Perimeter

Area and perimeter of shapes made from unit squares; finding area and perimeter of rectangles

Bar Graphs

Reading and interpreting bar graphs, comparing data using bar graph scales

Heuristics in P3

P3 is the first year students are formally expected to apply heuristics to solve non-routine problems. The MOE syllabus introduces these heuristics at the P3 level:

- **Guess and Check.** Students try plausible answers and adjust based on the results — typically the first non-algebraic heuristic students learn.
- **Working Backwards.** Starting from the final answer and reversing the operations to find the starting value.
- **Draw a Diagram.** Using bar models, number lines, and other visual representations to understand the problem structure.

P3 is also when the foundation for bar modelling is laid. While P3 bar models are simple (one bar or two bars with known totals), the model-drawing foundation established in P3 plays an important role in how comfortably a student handles multi-step problems in P4 and P5 bar model problems. For a step-by-step method parents can practise at home, see Chapter 4 (Word Problems).

Parent advice: Encourage your child to draw a bar model for every word problem, even simple ones. The drawing habit takes months to automate. Starting in P3 gives your child 3 full years to become fluent before PSLE.

A P3-Level Worked Example

Here is a bar model problem that shows how drawing a simple bar makes a fraction question clear. The fraction-of-a-set skill it uses (finding a fraction of a quantity) is formally introduced in P4.

Worked Example — P3 Level

John had 36 sweets. He gave 1/3 of them to his friend. How many sweets did John give away?

```
Step 1 — Draw a bar model:
Total = 3 units = 36 → 1 unit = 36 ÷ 3 = 12
Step 2 — Find 1/3 of the sweets:
John gave away 1 unit = 12 sweets
Answer: John gave away 12 sweets.
```

```
Teaching tip: The worked example above uses division within the multiplication tables —
a P3 skill — to find one equal part of a quantity. The formal "fraction of a set" topic
is introduced in P4, and harder "fraction of a remainder" problems appear in P5.
Getting comfortable with the bar model here makes those later topics far easier.
```

Choosing P3 Maths Classes in Singapore

Parents comparing **P3 maths classes in Singapore** should look for lessons that explain the model behind an answer, not just provide more worksheets. A useful class or online programme should include regular practice in multiplication, fractions, measurement and bar models, with time for the child to explain their thinking and correct mistakes.

- **Check the fit:** choose a pace that matches your child's current P3 topics rather than jumping straight to P6-style difficulty.
- **Prioritise worked solutions:** your child should see why a method works and practise using it independently.
- **Build consistency:** short, regular practice is usually more useful than occasional long sessions.

Which P3 topic requires the most attention?

Most P3 students find area and perimeter the most challenging because it requires understanding that shapes with the same perimeter can have different areas and vice versa. Equivalent fractions are the second most challenging topic — for example, understanding that 1/2 = 2/4 = 3/6 requires proportional reasoning that is new at this level.

My child is struggling with multiplication tables 6–9. Should I be worried?

No — this is very common. Tables 6–9 are harder to memorise because they do not have the patterns of 1, 2, 5 and 10. Focus on skip-counting daily (5 minutes a day is more effective than 30 minutes once a week) and use real-world grouping (e.g. "How many eggs in 7 cartons of 6?") to build conceptual understanding alongside rote memorisation.

How does P3 Maths prepare a child for P4?

P3 introduces the bar model habit and the CPA approach that underpin all Singapore Math from P4 to P6. Students who develop strong multiplication fact fluency and bar model drawing skills in P3 consistently perform better when fractions, decimals and heuristics are introduced in P4.

Supporting your child — building stage

- **Drill times tables.** The syllabus expects instant recall of all tables up to 10 × 10 by the end of P3. Five minutes of daily practice is far more effective than weekly cramming.
- **Embrace fractions in daily life.** Cut a pizza into quarters. Measure 3/4 cup of flour. Talk about half an hour. Fractions are everywhere — using them in context builds comfort.
- **Introduce bar model drawing before it is tested.** The syllabus expects students to use models at P3 and P4. Practice at home reduces the pressure when similar problems appear in graded work.
- **Check the 2021 syllabus alignment.** If you bought assessment books for P4 that include "turns and 8-point compass" or exclude "nets," they may be out of date.

Primary 4

Singapore Primary Math

Primary 4 is a critical year in Singapore primary mathematics. The curriculum widens significantly — introducing decimals, factors, unlike fractions, composite area and perimeter, and geometry — and the difficulty of word problems increases. Students who build strong foundations in P4 find the P5 transition much more manageable. This guide covers the P4 syllabus and how to prepare your child for what comes next.

The P4 Mathematics Syllabus

P4 introduces several entirely new topics while deepening the fractions and measurement skills started in P3. By the end of P4, students should be able to solve two-step word problems involving fractions, decimals, and measurement.

Factors & Multiples

Identifying factors, multiples, common factors and common multiples up to 100

Fractions

Mixed numbers, improper fractions, fraction of a set, add/subtract fractions with up to two different denominators

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Decimals

Decimals up to 3 decimal places, add/subtract up to 2 decimal places, multiply/divide by a 1-digit whole number

Four Operations

Multiplication (up to 4-digit by 1-digit, 3-digit by 2-digit) and division (up to 4-digit by 1-digit)

Area & Perimeter

Composite figures made up of rectangles and squares, finding one dimension given the area or perimeter

Geometry

Rectangle and square properties, line symmetry, nets of solids, measuring and drawing angles in degrees

Tables & Graphs

Reading and interpreting tables, line graphs and pie charts, completing tables from given data

Word Problems

Two-step word problems using bar models, combining fractions, decimals and measurement

Why P4 Matters for P5 Readiness

Three skills developed in P4 directly determine how well a student copes with the P5 difficulty jump:

- **Fractions with unlike denominators.** P5 percentage and rate problems build directly on fraction concepts. A student who struggles with equivalent fractions and unlike denominators in P4 will find percentage and rate in P5 very difficult.
- **Multi-step bar models.** P4 introduces word problems that require two bar models or combined models. This is the last year students can build the bar model habit without the pressure of P5 complexity.
- **Heuristic flexibility.** P4 students learn Before-After models, Simplify the Problem, and Solve Part of the Problem. These are the heuristics that P5 problems regularly require.

Parent priority: If your child is in P4 and struggles with fractions, make this the single focus for the year. Mastering fractions in P4 is the highest-leverage action you can take for their P5 success. Use bar models to visualise every fraction problem — the drawing habit pays off in P5.

A P4-Level Worked Example

Here is a typical P4 problem that combines fractions with bar model reasoning — the exact type of two-step question that prepares students for P5.

Worked Example — P4 Level

A fruit stall had 120 apples. 2/5 of the apples were red and the rest were green. How many more green apples than red apples were there?

```
Step 1 — Draw a bar model and find 1 unit:
Total = 5 units = 120 → 1 unit = 120 ÷ 5 = 24
Step 2 — Find the number of red and green apples:
Red = 2 units = 2 × 24 = 48
Green = 3 units = 3 × 24 = 72
Step 3 — Find the difference:
Difference = 72 - 48 = 24
Answer: There were 24 more green apples than red apples.
```

```
Teaching tip: For fraction word problems, encourage your child to always draw a bar
model and label the units. The key step is asking "what is 1 unit?" Once they find 1
unit, the rest of the problem becomes straightforward. This habit — finding the value
of one unit — is the same skill that P5 percentage problems and P6 ratio problems
require.
```

Which P4 topic do students find most challenging?

```
Most P4 students find fractions — especially equivalent fractions and
addition/subtraction of unlike fractions — particularly challenging. Another area that
requires careful practice is composite area and perimeter, which involves multiple
steps and requires students to find missing side lengths before calculating.
```

My child scored well in P3 but is struggling with P4 fractions. Is this normal?

```
Yes. P3 fractions are limited to like fractions (same denominator) and simple fractions
of a whole. P4 introduces unlike denominators, mixed numbers, and improper fractions —
a significant jump in abstraction. Most students need several months to adjust. Focus
on bar model drawing for every fraction problem.
```

Primary 5

Singapore Primary Math

Primary 5 represents a significant curriculum transition in Singapore primary mathematics. Students who did well in P4 by memorising procedures often struggle in P5 because the curriculum shifts from applying known methods to **choosing** the right method for unfamiliar, multi-step problems. This guide explains what changes, what topics are covered, and how parents can support their child through this critical year.

The P5 Mathematics Syllabus — What Your Child Will Learn

The P5 syllabus introduces several new topics while deepening existing ones. By the end of P5, students are expected to handle problems that combine fractions, decimals, and percentage in a single question — a level of complexity that was not required in P4.

Fractions

Multiplying fractions, adding and subtracting mixed numbers, fractions of remainder, fractions in multi-step word problems

Decimals

Multiplying and dividing by 10, 100 and 1000, converting measurements to decimal form, decimals in problem sums

%

Percentage

Expressing a part of a whole as a percentage, finding a percentage part of a whole, discount, GST and interest

Rate

Rate as the amount of a quantity per unit of another quantity, finding rate, total amount or number of units

Whole Numbers

Numbers up to 10 million, order of operations, use of brackets, multiplying and dividing by 10, 100 and 1000

Volume

Volume of cubes and cuboids, finding volume of liquid in a rectangular tank, L/ml and cm^3

triangle

Geometry

Area of triangles, angles on a line and at a point, angle sum of a triangle, properties of parallelograms, rhombuses and trapeziums

Parent tip: Two topics — **percentage and rate** — are new to P5 and often present notable challenges. These are not just isolated topics; they are frequently combined in single word problems by Term 3. Focus extra practice time on these two areas early in the year.

Why Is P5 So Much Harder Than P4?

Many parents tell us their child "suddenly" struggles in P5. The change is not sudden — it is a convergence of several factors that make P5 the most demanding year before the PSLE. If the P4 foundations in the table below look shaky, the Primary 4 Maths guide shows what should already be secure.

Factor	What Happens in P4	What Happens in P5
New topics	Students learn fractions, decimals, area and perimeter	Three challenging new topics: **percentage, rate, and whole numbers up to 10 million** — introduced within the first two terms
Topic depth	Fractions taught as part of a whole; simple like-fraction addition	Fractions include multiplication of fractions, mixed number operations, and fractions of remainder — multi-step reasoning required
Word problem complexity	Single-concept word problems (e.g., "find the area")	Multi-concept problems (e.g., "Ali spent 2/5 of his money on a book and 1/3 of the remainder on food. He had $24 left. How much did he start with?")
Number size	Numbers generally under 10,000	Numbers up to 10,000,000; decimals to 3 decimal places
Heuristics demand	Students use Guess and Check, Draw a Diagram, Make a List	Before-After, Assumption Method, and Simplify the Problem become essential; many problems require combining two heuristics
Expectation shift	Teachers often guide students to the right method	Students are expected to **choose** the right method independently — the single biggest source of P5 difficulty

What this means for parents: If your child scored 80–90 in P4 but drops to 60–70 in P5 Term 1, do not panic. This is normal. The adjustment period usually lasts one to two terms. The key is to identify whether the struggle is with a specific topic (start there) or with multi-step reasoning (focus on bar model drawing).

A P5-Level Worked Example

Here is a typical P5 problem that combines fractions and percentage — notice how it requires several steps to solve.

Worked Example — P5 Level

A shop had 240 apples. On Monday, it sold 2/5 of the apples. On Tuesday, it sold 30% of the remaining apples. How many apples were not sold?

```
Step 1 — Find apples sold on Monday:
2/5 × 240 = 96 apples sold → Remaining = 240 - 96 = 144
Step 2 — Find apples sold on Tuesday:
30% of 144 = 0.3 × 144 = 43.2 → 43 apples (fraction of an apple is not possible in context; assume 43)
Step 3 — Find apples not sold:
144 - 43 = 101 apples
Answer: 101 apples were not sold.
```

```
Teaching tip: When helping your child with multi-step problems like this one, encourage them to write a short label after each step (e.g., "Remaining after Monday: 144"). This makes it much easier to track what each number represents — and makes checking work faster.
```

Three Most Common P5 Mistakes — and How to Fix Them

Mistake: Confusing the part and the whole

In problems involving fractions of a remainder, students often treat the remainder as the whole. For example: "She spent 1/3 of her money on a dress and 1/4 of the remainder on shoes" — students take 1/4 of the original amount instead of 1/4 of the remainder.

Fix: Draw a fraction bar model

Draw a bar for the total, divide into thirds. Remove one third (dress). Now draw the remaining two-thirds as a new bar and divide into quarters (shoes). The visual prevents the "remainder vs. whole" confusion automatically.

Mistake: Stopping at 1 unit

In problems that use the "1 unit" approach (fractions in P5, and ratio from P6), students correctly find that 1 unit = 12 but answer "12" when the question asks for "the total number of stickers" (which is 7 units = 84).

Fix: Circle the question before solving

Before drawing any model, underline the exact sentence that asks the question. Write a note: "Find total stickers = ____ units." After finding 1 unit, check the note: "Am I answering with 1 unit or the total?"

Mistake: Misapplying the Assumption Method

Students learn the Assumption Method in P5 but apply it to problems where Guess and Check would be simpler — or make arithmetic errors in the "excess × difference" step.

Fix: Practise the structure separately

Write a template: "Assume all are X → total value = ___. Actual value = ___. Difference = ___. Difference per item = ___. Number of Y items = difference ÷ difference per item." Practise with small numbers first (e.g., 5 vehicles, 16 wheels) until the structure is automatic.

A Study Rhythm for P5 Parents

Consistency matters more than intensity in P5. Here is a realistic weekly rhythm that many Singapore parents find effective.

Suggested weekly P5 Math routine:

- **Monday–Thursday (20 min each):** One or two word problems from the current school topic. Use the full UPDC process (Understand, Plan, Do, Check) in writing. Focus on one topic per week.
- **Friday (20 min):** Review the week's mistakes. Identify which step in UPDC caused the error. Re-solve one corrected problem.
- **Weekend (30 min):** Mixed-topic practice. Choose 3 problems from different topics (e.g., one fraction, one percentage, one geometry) to keep earlier topics fresh.

Keep the habit simple: 20 minutes per day is more effective than 2 hours on Sunday. Short, daily practice builds the bar model habit and prevents the "panic before a test" cycle. If your child is very tired after school, 10 minutes is still valuable — consistency matters more than duration.

My child scored well in P4 but struggled in P5 Term 1. Is this normal?

Yes. Many students who did well in P4 by mastering the procedures find P5 difficult because the expectation shifts from "apply this method" to "choose the right method." This adjustment typically lasts one to two terms. The most effective response is to focus on bar model drawing for all word problems — the visual structure helps bridge the gap between knowing a method and knowing when to use it.

Which P5 topic do students find most challenging?

Many P5 students find **percentage** particularly challenging, because it requires flexible thinking across fractions, decimals, and rate simultaneously. Another demanding area is **fractions of a remainder**, which combines a fraction step with the leftover amount. These two topics deserve extra practice time.

Does P5 Maths include ratio or algebra?

No. Under the 2021 syllabus, ratio and average were moved from P5 to P6, and algebra is introduced only in P6. The new topics in P5 are percentage, rate, and more advanced fraction operations. Ratio (including a:b:c) and formal algebra first appear in the P6 year.

Should my child start PSLE preparation in P5?

P5 is the right time to build the **habits** that lead to PSLE success — showing clear working, checking answers, drawing bar models consistently — rather than drilling PSLE papers. Starting PSLE papers in P5 can cause unnecessary stress. Focus on mastering the P5 syllabus thoroughly; the PSLE preparation in P6 will be far more effective if the foundation is solid.

Supporting your child — mastery stage

- **Focus on word problem reading.** By P5, the maths is harder, but the reading demand is often the bigger barrier. Encourage your child to chunk each question: underline what is given, circle what is asked, and draw a model before calculating.
- **Prioritise accuracy over speed for Paper 2.** The PSLE Paper 2 rewards clear working and correct method marks. Rushing causes careless errors. Build the habit of checking each step.
- **Use PSLE-specific resources.** See the Appendix for related PSLE exam guides and syllabus links.
- **Watch for the P5 difficulty jump.** Many students who sailed through P1–P4 hit a wall in P5. This is normal. The syllabus adds multiple new concepts at once — resilience and consistent practice matter more than raw ability.

Primary 6

Singapore Primary Math

Primary 6 is the culmination of the Singapore primary mathematics journey. Students consolidate everything learned from P3 to P5 while mastering new topics — circles, average, and advanced volume and angle problems — that bridge to secondary school mathematics. This guide explains the P6 syllabus, how it maps onto the PSLE Maths paper, and provides a practical revision plan for the final year.

The P6 Mathematics Syllabus

The P6 syllabus has two components: new topics taught for the first time, and consolidation of all earlier topics at a higher difficulty level. By the end of P6, students should be able to solve multi-step problems that combine fractions, ratio, and percentage — or fractions, ratio, and circles — in a single question.

Circles

Area and circumference of circles, semicircles, quarter circles, composite figures

Special Quadrilaterals

Finding unknown angles in composite figures using squares, rectangles, triangles, parallelograms, rhombuses and trapeziums

Volume of Cube & Cuboid

Finding one dimension, edge length, height or face area given volume; liquid in a rectangular tank

Ratio

Ratios a:b and a:b:c, equivalent ratios, dividing a quantity in a given ratio, ratio and fraction

Algebra

Using a letter to represent an unknown, simple algebraic expressions and linear equations

Average

Average as 'total value ÷ number of data'; relationship between average, total value and number of data

Division of Fractions

Dividing a proper fraction by a whole number and by a proper fraction; percentage increase/decrease

P3–P5 Consolidation

Fractions, decimals, percentage, geometry and measurement — all revisited at higher difficulty with multi-step problems

Parent tip:Circles and volume are two major new topics in P6. Circles introduce a constant (π) for the first time, while volume problems now require working backwards from a given volume to find an unknown dimension. Algebra is also introduced for the first time in P6, using letters such as x and y to represent unknown numbers — building on the '1u' bar model notation students have used since P3.

How P6 Maps onto the PSLE Maths Paper

The PSLE Mathematics paper tests the full P3–P6 syllabus. Here is the paper structure as of the current MOE format.

Paper	Duration	Sections	Marks	Calculator
Paper 1	1 hour 10 min	A: 18 MCQ (26 marks) B: 12 short-answer (24 marks)	50	Not allowed
Paper 2	1 hour 20 min	5 short-answer (10 marks) 10 structured/long (40 marks)	50	Allowed

Key implications for P6 students:

- **Paper 1 tests speed and accuracy.** 30 questions in 70 minutes means about 2 minutes per question. Students must be fluent with basic operations without a calculator.
- **Paper 2 tests depth and reasoning.** Longer questions require clear step-by-step working. Marks are awarded for method, not just the final answer.
- **Algebra appears mainly in Paper 2.** Students who struggle with algebra can still score well by using bar models — many Paper 2 problems can be solved with either approach.

What Is New in P6 Compared to P5

Four main topics are introduced in P6. The rest of the syllabus is consolidation of P3–P5 content at a higher difficulty level.

Topic	What Is New	Why It Matters
Circles	Circumference = πd, Area = πr^2. Composite figures with semicircles and quarter circles.	First encounter with a constant (π) in a formula. Teaches approximation (use $\pi = 3.14$ or 22/7).
Special Quadrilaterals	Finding unknown angles in composite figures combining squares, rectangles, triangles, parallelograms, rhombuses and trapeziums.	Combines the angle properties learned in P5 with multi-step geometric reasoning.
Volume of Cube & Cuboid	Working backwards: finding one dimension, edge length, height or face area given the volume.	Reverses the basic P5 volume formula, requiring algebraic thinking without formal algebra.
Average	Average = total value ÷ number of data, and finding a missing value given the average.	Bridges statistics and number reasoning. Frequently combined with fractions and ratio in word problems.

Worked Example — P6 Level (Volume + Fractions)

Worked Example — P6 Level

A rectangular tank is 40 cm long and 30 cm wide. It is 2/3 filled with water. The water has a volume of 16 litres. What is the height of the tank?

```
Step 1 — Find the total volume of the tank:
2/3 of the tank = 16 litres
So 1/3 of the tank = 16 ÷ 2 = 8 litres
Total volume = 3 × 8 = 24 litres = 24 000 cm³ (1 litre = 1000 cm³)
Step 2 — Find the base area:
Base area = 40 × 30 = 1200 cm²
Step 3 — Find the height:
Height = Volume ÷ Base area = 24000 ÷ 1200 = 20 cm
```

```
Answer: The height of the tank is 20 cm.
```

A Practical Revision Plan for the PSLE Year

The P6 school year runs from January to the PSLE in late September or early October. Here is a suggested month-by-month approach.

Term 1 (Jan–Mar) — Master New Topics

Focus on circles, volume, and special quadrilaterals. These are key new topics and benefit from early practice. Do not worry about revision yet — build a strong foundation in the new content first.

Term 2 (Mar–May) — Consolidate P5 Topics

Review fractions, ratio, percentage, and decimals. Many students have forgotten these by Term 2 of P6. Use mixed-topic practice: one fraction, one ratio, one percentage problem per session.

June Holidays — Systematic Revision

This is a key revision period. Spend 3–4 weeks covering one major topic area per week: (1) fractions, decimals, percentage, (2) ratio and average, (3) geometry and volume, (4) algebra and circles. Use the PSLE Heuristics guide for problem-solving strategies.

Term 3 (Jul–Sep) — PSLE Paper Practice

Start with individual paper sections, then move to full timed papers. Focus on identifying weak areas from practice paper results. Spend the final 2–3 weeks on revision of common mistakes rather than new content.

For more detailed PSLE exam preparation: See the PSLE Maths Tips: Problem-Solving Strategies & Exam Techniques guide, which covers Paper 1 vs Paper 2 strategy, time management, and common PSLE question types.

My child is struggling with algebra in P6. Should we go back to bar models?

Yes. Algebra and bar models are not competing methods — they are complementary. The formal algebra taught in P6 (simplifying $3x + 2x$, solving $2x + 5 = 13$) is built on the same conceptual foundation as the '1u' unit notation used in bar models since P3. If algebra is confusing, draw the bar model first, solve, then write the algebraic equation alongside. Many students find that seeing both representations side by side makes algebra click.

Should my child use a calculator for Paper 1 practice at home?

No. Paper 1 does not allow calculators, so all home practice for mental arithmetic and short-answer questions should be done without one. Calculator skills should be practised separately for Paper 2 — knowing when to use a calculator and when mental arithmetic is faster is a skill in itself.

When should my child start doing full PSLE practice papers?

Full PSLE practice papers are most effective from Term 3 (July onwards). Starting earlier can cause unnecessary stress and often leads to students memorising answers rather than learning from mistakes. Before Term 3, focus on topic-by-topic mastery and mixed-topic practice without time pressure.

Syllabus checklist

Topics for this stage from the MOE 2021 Primary Mathematics Syllabus. Use this list to identify any gaps before moving on.

- **Circles, Ratio, Algebra, Average, PSLE Preparation:** Circles (circumference and area), special quadrilaterals (finding unknown angles in composite figures), volume of cubes and cuboids (finding an unknown dimension), average of a set of data, ratio (including a:b:c), algebra (introduction), division of fractions, percentage increase/decrease, comprehensive PSLE revision of P3–P6 content.

Further Resources and Official References

The Singapore Primary Mathematics syllabus is published by the Ministry of Education (MOE) and made available to the public. Parents can consult official syllabus documents and curriculum briefings directly at:

MOE 2021 Primary Mathematics Syllabus (P1–P6), updated October 2025 (PDF) — www.moe.gov.sg/media/files/primary/2021%20Primary%20Mathematics%20Syllabus%20P1%20to%20P6%20Updated%20October%202025.pdf

MOE Primary Curriculum page — www.moe.gov.sg/primary/curriculum

Online Chapter Editions

Online editions of the chapters in this guide are maintained and regularly updated at pslehero.org:

Singapore Math Guide — pslehero.org/singapore-math.html

Syllabus Overview — pslehero.org/singapore-math-syllabus.html

Heuristics — pslehero.org/singapore-math-heuristics.html

Bar Models — pslehero.org/singapore-math-bar-model.html

Word Problems — pslehero.org/singapore-math-word-problems.html

Primary 1 and 2 — pslehero.org/singapore-primary-1-2-math.html

Primary 3 — pslehero.org/singapore-primary-3-math.html

Primary 4 — pslehero.org/singapore-primary-4-math.html

Primary 5 — pslehero.org/singapore-primary-5-math.html

Primary 6 — pslehero.org/singapore-primary-6-math.html

Related PSLE Preparation Resources

PSLE Maths Tips — pslehero.org/psle-maths-tips.html

PSLE Maths Heuristics — pslehero.org/psle-maths-heuristics.html

PSLE Maths Model Drawing — pslehero.org/psle-maths-model-drawing.html

Free PSLE Practice Questions — pslehero.org/free-psle-practice-questions.html

P4 Subject-Based Banding Guide — pslehero.org/p4-subject-based-banding-guide.html

Interactive Practice

For students seeking interactive question sets and timed mock quizzes, practice questions and companion revision tools are accessible via pslehero.org.

This reference guide was compiled in September 2026. For current syllabus announcements, visit:

pslehero.org