

Helping Your Child with Mathematical Modelling

Number · Prep to Year 6 · Australian Curriculum Mathematics

Mathematical modelling means using maths to solve **real problems**. It is not just about getting an answer. It is about understanding the problem, choosing the right maths, and checking the answer makes sense. Your child practises this from Prep all the way to Year 6. It is one of the most useful maths skills for everyday life.

Year level	What your child learns to do	What this looks like
Prep	Acting out real problems Your child acts out real situations with objects and role-play. They learn that maths is about real life — not just sums on paper. represent — show a problem with objects, drawings or actions situation — a real-life story or event that needs maths No written number sentences yet — just hands-on exploration .	Share 8 grapes between 4 people. "How do you know everyone has the same?" Act out a shop with toy money. "Do we have enough for everyone?"
Year 1	Drawing the problem Your child learns to draw a picture or use materials to show a maths problem. This helps them see what is happening before they calculate. addition — putting groups together (more) subtraction — taking away or finding the difference (less) They solve simple money problems using whole dollar amounts.	"3 cars need 4 wheels each. How many wheels altogether?" Draw 3 cars. Count 4 wheels on each. "How many wheels did you count?" Answer: 12 wheels
Year 2	Choosing the operation Your child learns to read a problem and decide which operation to use. operation — the maths action: + add, – take away, × groups, ÷ share They write a number sentence to show the problem. "5 children each pay \$3. How much altogether?" $\rightarrow 5 \times 3 = 15$ so \$15	Visit a shop together. "Which operation do we need — add or multiply?" "How much for 3 of these at \$2 each?" Write the number sentence together.
Year 3	Bar models and number sentences Your child uses a bar model — a rectangle diagram — to show what is known and what is missing. "I had 75 tomatoes. I picked more. Now I have 138. How many did I pick?" formulate — turn the real problem into a maths sentence The bar model helps your child see: $75 + ? = 138$ They choose + or –, × or ÷ and explain why.	"What do you already know in this problem?" "What are you trying to find out?" Draw a long rectangle. Mark what you know. Leave a gap for the unknown.
Year 4	Multi-step problems and budgets Your child solves problems that need more than one step . They learn to check: does my answer make sense? This is called interpreting the answer. "A class of 24 needs 4 buses. Each bus costs \$85. How much altogether?" Step 1: How many buses? $24 \div 4 = 6$ buses Step 2: Total cost? $6 \times \$85 = \510	"What is the first thing we need to work out?" "Does that answer make sense?" Plan a simple family budget. Add up weekly spending together.
Year 5	Exact or approximate? Your child learns to decide if they need an exact answer or just an estimate . estimate — a careful guess that is close enough approximate — not exact, but close They also work with percentages and decimals in real situations: "A \$40 shirt is 25% off. How much do you save?"	"Do we need an exact answer or a close-enough one?" Look at sale signs in shops. "How much is 10% off \$60?" Plan a fundraiser budget together.

Year 6	Research, budget and justify Your child solves complex problems using real-world data. They research real costs, create a budget , and justify every decision they make. justify — explain why you chose a particular maths method They ask: " Can I afford it? Do I need it? How long to save? " They write their working clearly so someone else can follow it.	"How did you decide which operation to use?" Plan a family holiday budget. Research real prices online together. "What would you cut if you had less money?"
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★ The 4 steps of mathematical modelling — used at every year level

Step	What your child does	A question you can ask
1 Formulate	Read the problem carefully. Work out what you already know and what you need to find out.	<i>"What information do you have? What are you trying to find out?"</i>
2 Solve	Choose a strategy — drawing, a number sentence, estimating. Do the maths.	<i>"Which operation will you use? Why did you choose that one?"</i>
3 Interpret	Look at your answer. Does it make sense in real life? You cannot have half a person on a bus!	<i>"Is your answer reasonable? Does it match the real situation?"</i>
4 Communicate	Explain what you did and why. Someone else should be able to follow your thinking.	<i>"Can you explain your working to me? How did you solve it?"</i>

Your child does all 4 steps — not just step 2! The thinking around the maths matters just as much as the answer.

Helping at Home — Mathematical Modelling

Worked examples and questions to ask · Prep to Year 6

The 4 steps in action — worked examples

Year 1–2 — A simple problem

"There are 3 tables. Each table has 4 children. How many children altogether?"

1 Formulate	I know: 3 tables, 4 children at each. I need to find: the total number of children.
2 Solve	Equal groups → I'll multiply. $3 \times 4 = 12$
3 Interpret	12 children. That sounds right for a small classroom.
4 Communicate	I used multiplication because there were equal groups — the same number at every table.

Year 3–4 — Using a bar model

"I had some money. I spent \$38. Now I have \$25. How much did I start with?"

? — the starting amount		
\$38 spent	\$25 left	\$63 start

The bar shows: $\$38 + \$25 = \$63$. So I started with **\$63**. This makes sense — $\$63 - \$38 = \$25$ ✓

Year 5–6 — A real-world budget

"Our family of 4 wants to go to the movies. Tickets are \$18 each. Popcorn is \$7 each. How much will it cost? Can we afford it with \$100?"

1 Formulate	4 people, \$18 tickets, \$7 popcorn — total cost vs \$100 budget
2 Solve	Tickets: $4 \times \$18 = \72 Popcorn: $4 \times \$7 = \28 Total: $\$72 + \$28 = \$100$
3 Interpret	$\$100 =$ exactly our budget. No money left over — we'd need to skip anything extra.
4 Communicate	I multiplied first (equal amounts per person) then added the two totals.

Year 6 extension: If tickets go up 10%, what is the new cost? ($\$18 \times 1.10 = \19.80)

Questions to ask your child

For every problem — ask about all 4 steps, not just the answer!

P Prep

- Can you show me that problem with these blocks?
- Act it out — who will share the food?
- Does everyone have the same? How do you know?

1 Year 1

- Draw a picture of the problem for me.
- How many groups are there? How many in each group?
- Does your answer make sense?

2 Year 2

- Which operation will you use — add, subtract, multiply or divide?
- Can you write a number sentence to show the problem?
- If each person pays \$4, how much for all 5 of us?

3 Year 3

- What do you already know in this problem?
- What are you trying to find out?
- Draw a bar to show the known and unknown parts.

4 Year 4

- What is the first step? What comes after?
- Does your answer make sense in real life?
- How much would it cost to feed our family for one week?

5 Year 5

- Do you need an exact answer, or is an estimate enough?
- How would you check your answer is reasonable?
- If that item is 20% off, how much will you save?

6 Year 6

- How did you decide which operation to use?
- Can you explain your working so I can follow it?
- If we had \$50 less, what would we cut from the budget?

Things to try at home

Any age: Use maths at the shops. Pick an item and ask: how much for 3 of these? Do we have enough money?	Year 1–2: Play shop at home. Use real coins. Ask your child to work out change. Draw the problem first.
Year 2–3: Write a problem on paper together. "6 eggs per carton, 2 cartons — how many eggs?" Solve it together.	Year 3–4: Plan a simple budget — a birthday party, a family outing, a weekly shop. What can we afford?
Year 5: Look at sale signs. "30% off \$50 — how much do we save?" Estimate first, then check.	Year 6: Research real costs online for a family trip. Build a spreadsheet or list. Justify every choice.

Key words to learn together

mathematical modelling: using maths to solve a real-life problem, step by step	formulate: work out what the problem is asking and what maths you need
solve: choose a strategy and work out the answer	interpret: check if your answer makes sense in real life
communicate: explain your thinking clearly so others can follow	represent: show a problem using objects, drawings, or number sentences
situation: a real-life story or event that needs maths to solve	operation: the maths action: + add, – subtract, × multiply, ÷ divide
number sentence: maths written with numbers and symbols: $3 \times 4 = 12$	bar model: a rectangle diagram to show what is known and what is missing
estimate: a careful guess — close to the answer but not exact	justify: explain why you made a choice or used a particular method

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