


# Modelling with Number: Solving Real-World Problems

## Explicit teaching — I Do (~15 min)

### The modelling process [WA6MNAM1](#)

 A circular four-stage modelling cycle: Analyse, Represent, Solve, Interpret and communicate.

*The four stages of mathematical modelling.*

1. **Analyse** — what is the situation asking? What information matters?
2. **Represent** — choose operations or equations to model it.
3. **Solve** — carry out the calculations.
4. **Interpret & communicate** — what does the answer mean in context? Is it reasonable? Justify decisions.

**Worked example.** "A class of 28 students shares 7 pizzas cut into eighths. Does everyone get 2 slices?"

- **Analyse:** total slices vs students.
- **Represent:**  $7 \times 8$  slices, then  $\div 28$  students.
- **Solve:**  $56 \div 28 = 2$ .
- **Interpret:** yes — each student gets exactly 2 slices.

## Guided practice — We Do (~20 min)

1. **Shared problem.** "A school excursion costs \$480 for 30 students. Each has paid \$14 so far — how much more is needed in total?" Work through the four stages together on the planning sheet.
2. **Order-of-operations problem.** Model a multi-step word problem requiring brackets; emphasise representing it as a single expression.
3. **Critique.** Show a fully worked solution with no interpretation step; the class adds the missing "what does it mean?" sentence.

## Independent practice — You Do (~15 min)

Students choose one of three real-world problem cards (whole numbers, order of operations, same-denominator fractions) and complete the full modelling cycle on a planning sheet:

- analyse and underline the key information;
- represent with an equation or expression;

- solve;
- write one or two sentences interpreting the answer and justifying decisions.

**Exit ticket.** In one sentence, explain why the "interpret and communicate" stage matters.

## Teacher notes

### Teacher notes

**Curriculum link:** WA6MNAM1 (capstone — coverage *mastered*). Draws together Lessons 1–5.

**Materials:** problem cards, a modelling-process poster, blank "Analyse / Represent / Solve / Communicate" planning sheets.

### Common misconceptions

- Jumping straight to calculation without analysing what is asked.
- Giving a bare number with no interpretation ("2" instead of "yes, each student gets 2 slices").
- Not checking reasonableness.

**Assessment for learning:** assess the *process* via the planning sheet, not just the final answer. This lesson is ideal evidence for an assessment task.

## Approaches

### COLLABORATIVE · COLLABORATIVE PROBLEM-SOLVING APPROACH

#### Collaborative problem-solving approach

Make the modelling cycle a collaborative, talk-rich process so reasoning is shared and visible.

**Roles in groups of three.** Use visibly random groups, each with an Analyser (identifies key info), a Representer (sets up the maths) and a Communicator (writes the interpretation). Rotate roles across problems.

**Vertical surfaces.** Work on whiteboards or windows so thinking is public and groups can borrow strategies.

**Gallery walk.** Groups inspect each other's modelling sheets and leave one "I like / I wonder" note.

**Talk moves.** Use prompts such as "Can you justify that?" and "Does that answer make sense?" to push the interpret-and-communicate stage.

## Visual: Bar-Model Thinking for Every Problem

This approach makes the bar model the class's default tool for unpicking word problems. Drawing the situation before calculating helps visual and spatial learners see *which* operation a problem needs.

**Part-whole bars.** For "equal parts" and "fraction of" problems, draw one long bar and split it. The whole sits above; the parts sit inside. Label the known and mark the unknown with a question mark.

**Comparison bars.** For "more than / less than" problems, draw two bars stacked. The difference shows as the extra length on the longer bar — students can see the subtraction.

**Draw, then decide.** Insist students draw the bar *before* choosing an operation. The picture usually makes the operation obvious, which builds confidence with multi-step problems.

**Gallery walk.** Students post their bar models around the room. The class tours them and matches each bar to the word problem it solves, discussing why the drawing fits.

**Why it works.** A bar model is a bridge between concrete and abstract. It externalises the structure of a problem so students reason about relationships rather than guessing which numbers to combine.