LESSON PLAN

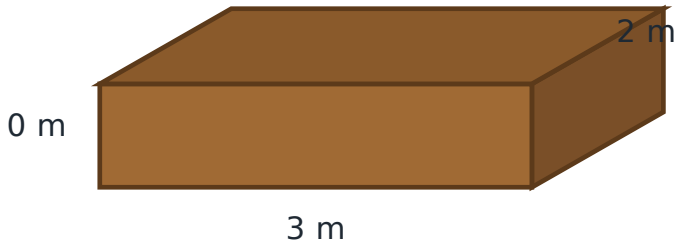
Modelling with Measurement & Geometry: Real-World Applications

Explicit teaching — I Do (~15 min)

Modelling with measurement & geometry WA6MMGM1

Revisit the four-stage modelling cycle (analyse → represent → solve → interpret/communicate), now applied to measurement and geometry contexts.

Design Task: Filling a Garden Bed



Volume = 3 × 2 × 0 = 2 m³ = 1800 L

1800 ÷ 30 = 60 bags of soil

A design task worked through the modelling cycle.

Worked example. "Design a class garden bed $3\,m \times 2\,m$, filled $0.3\,m$ deep. How much soil, and how many $30\,L$ bags?"

- **Analyse:** dimensions, depth, bag size.
- **Represent:** volume $= 3 \times 2 \times 0.3\,m^3$.
- **Solve:** $1.8\,m^3 = 1800\,L$; $1800 \div 30 = 60$ bags.
- **Interpret:** "We need 60 bags" — check reasonableness and note rounding up where needed.

Guided practice — We Do (~20 min)

1. **Shared design task.** "Wrap a rectangular-prism gift box" — find the area of paper needed, working through all four stages together.
2. **Convert and solve.** A journey-itinerary problem combining duration with distance/unit conversion.
3. **Critique a model.** Show a solution that mixed cm and m; the class finds and fixes the error, then rewrites the interpretation.

Independent practice — You Do (~15 min)

Project task: students choose a real-world brief (e.g. design a sandpit and order sand; plan a fish-tank volume; map a treasure route on a coordinate grid) and complete the full modelling cycle on a planning sheet, using measurement/geometry skills and correct units.

> **Exit ticket.** Name one place where mixed-up units could ruin a real design, and how you would avoid it.

Teacher notes

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Curriculum link: WA6MMGM1 (capstone — coverage *mastered*). Pulls together Lessons 7–9.

Materials: project briefs, planning sheets, rulers, grid paper, calculators for checking.

Common misconceptions

- Mixing units within one calculation (cm with m).
- Not rounding sensibly in context (you cannot buy 59.7 bags).
- Skipping the interpret/communicate stage.

Assessment: an excellent rich-task assessment opportunity; assess against the modelling process. Could be paired with WA6MNAM1 (Lesson 6) into one combined modelling assessment.

Approaches

PROJECT-BASED · PROJECT-BASED DESIGN APPROACH

Project-based design approach

Frame the lesson as a hands-on design project so the mathematics serves a real, tangible goal.

Designer/engineer brief. Students take on a brief with a tangible deliverable — a labelled plan, a scale sketch, or a materials order.

Real constraints. Provide a budget, bag/tile sizes and opening hours so rounding and interpretation matter authentically.

Prototype and revise. Students draft a solution, get peer feedback against the four modelling stages, then refine.

Pitch. Each group presents what they designed, the maths behind it, and why their answer is reasonable — emphasising the interpret-and-communicate stage.

Collaborative: The Classroom Makeover Project

This approach puts students into design teams with shared roles to plan and cost a real space. Working together on one deliverable builds communication and lets students check and challenge each other's measurements.

The brief: "Your team has a budget to refresh a corner of the classroom (or a garden bed outside). Measure it, design it, and cost it. The team with the most accurate, best-value plan wins the tender."

Assign roles. Surveyor (takes and records measurements), Designer (sketches the plan to scale), Accountant (works out areas, volumes and costs), and Presenter (prepares the pitch). Rotate roles between tasks so everyone measures and calculates.

Measure and plan. Teams measure the real space, convert units as needed, and calculate perimeter, area and any volumes (e.g. soil or paint).

Cost it. Using a shared price list (fencing per metre, paving per m^2, soil per bag), teams total their plan and check it against the budget, then look for a saving.

Cross-check. Teams swap plans and audit each other's arithmetic and unit conversions before the final pitch.

Why it works. A shared, authentic deliverable makes measurement choices matter, and the audit step turns checking and justifying into a natural part of the teamwork.