

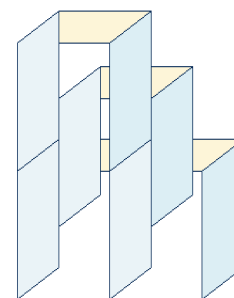


PLANS, ELEVATIONS AND MEASURES

GCSE Mathematics 1MA1 · L037 · 60 minutes

Week 13 · Reach for the Star Gold Standard

From a 3D object to plan, front and side elevations



3D object



Plan



Front elevation

Elevation = straight-on view; plan = view from above. Hidden depth can create ambiguity

Objective and lesson route

Connect & Check

By the end you will:

- interpret plan, front and side elevations
- connect 2D views to a 3D object
- explain when views do not determine a unique solid
- use scale carefully where specified

Running order

- Connect & Check · 5 min
- Share · 5 min
- Present · 12 min
- Apply · 25 min
- Recall & Review · 8 min

Core work is non-calculator. A calculator may be used only for a labelled scale/area check.

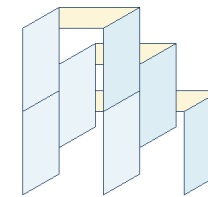
Baseline: what do you already know?

Connect & Check

Work independently · 5 minutes

- From above, which information about a solid can a plan show?
- Explain the difference between a plan and a front elevation.

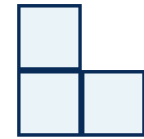
From a 3D object to plan, front and side elevations



3D object



Plan



Front elevation

Elevation = straight-on view; plan = view from above. Hidden depth can create ambiguity.

Keep this response for distance-travelled comparison.

Choose your route

[Share](#)

Same destination. Different journey.

A · Visual

Build or sketch the solid
and draw each view.

B · Method

Use a grid and project
heights/widths
systematically.

C · Explain

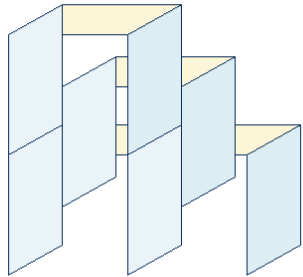
Describe what each
viewpoint can and cannot
reveal.

Compare evidence with a partner before you continue.

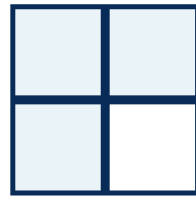
Model: one solid, three views

Present

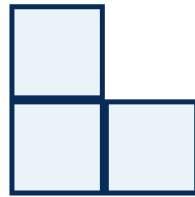
From a 3D object to plan, front and side elevations



3D object



Plan



Front elevation

Elevation = straight-on view; plan = view from above. Hidden depth can create ambiguity

- Plan looks down from above.
- Front elevation removes depth.
- Side elevation removes width.
- Stacking may be hidden in a plan unless height is encoded.

Ask: what information has been lost in each view?

Worked example

Present

A plan is an L of three unit squares. One occupied square contains a stack two cubes high. What can each view show?

- Plan: occupied positions only.
- Front/side: project maximum column heights from that direction.
- State the named front before drawing.

Check: views must align to the same dimensions.

Misconception check

Present

“If two solids have the same front elevation, they must be the same solid.”

- What information does the front view lose?
- Can cubes move in depth without changing the front projection?
- Construct a counterexample.

Repair: front elevation does not uniquely encode depth.

Supported practice

Apply

A solid has a front elevation with column heights 2, 1 and 1. Sketch one possible arrangement of unit cubes.

Scaffold: draw a grid, mark viewing direction, then project occupied positions/max heights.

A plan occupies an L-shape of three squares. Explain what extra information is needed to determine the solid uniquely.

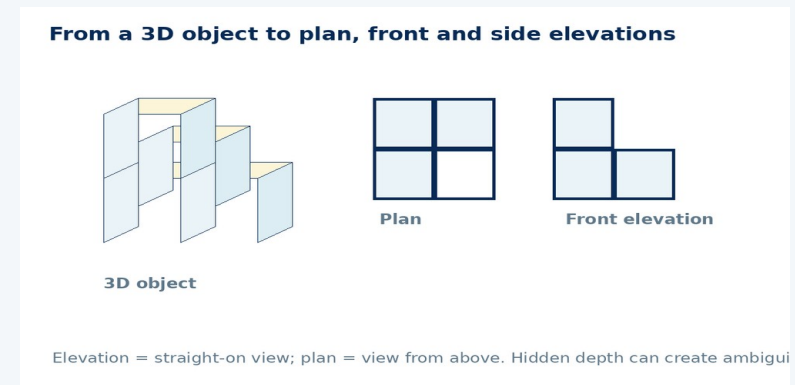
Remove the scaffold before the next slide.

Independent practice: scaffold removed

Apply

- Draw the plan, front elevation and side elevation of a 2×2 base where one corner has a second cube stacked on top.
- Two solids have the same front elevation. Give one reason their plans might differ.

Show a separate check or justification.



Exam-style practice

Apply

A rectangular room measures 6 cm by 4 cm on a 1:100 plan. Find the real floor area in m^2 .

A solid has identical front and side elevations, each two squares wide and two squares high. Must the plan be a 2×2 square? Explain with a counterexample or convincing description.

Exam tip: label the view and keep scale units consistent before squaring for area.

Stretch and deep challenge

Apply

Stretch

Sketch two different solids that have the same front elevation but different side elevations.

Deep challenge

Two solids have identical front and side elevations. Must their plans be identical? Explain using a specific arrangement of cubes.

A counterexample is enough to disprove a “must” statement.

Self-mark and repair

Apply

Identify the first decision that went wrong.

- Did you state the viewing direction?
- Did you remove perspective?
- Did you preserve width/height alignment?
- Did you accidentally assume hidden depth/height?
- Did you convert scale lengths before area?

Repair one answer, then solve a fresh matched question without prompts.

Independent exit evidence

Without notes · 5 minutes

A solid is made from four cubes: three form an L-shape on the base and one is stacked on the corner cube. Describe or sketch its plan and front elevation.

- Give the plan.
- Give a named elevation.
- Explain one hidden feature.

Fresh evidence against the objective.

Distance travelled

Compare your baseline with the exit evidence.

WWW What is now more accurate, complete or clearly explained?

EBI What one action will improve your next answer?

Record the next-practice target in the workbook.

Core answers

Teacher check

- C1 plan shows footprint/positions, not necessarily height
- C2 plan = above; elevation = straight-on named view
- E1 24 m^2
- Same front does not force same depth
- Plan may be identical while stacking differs



L037 teacher notes

- Keep viewpoint language explicit.
- Manipulatives are optional scaffolds, not the final evidence.
- Remove perspective from elevations.
- Accept counterexamples for non-uniqueness.

Next: L038 Pythagoras in two dimensions

L037 Recall & Review

Plans elevations and measures



Fresh evidence: prove the objective

Solve a new question without prompts. Explain one check, then correct one error in your working.

Objective: Interpret plans and elevations and connect views to three-dimensional objects.

Write the next practice step before you leave. It must test the method again, not simply copy today's example.

Feedback language

Use the full phrases before the abbreviations.

What Went Well (WWW)

I selected the correct geometric fact, theorem, formula or transformation and used a clear diagram with appropriate labels and units.

Identify the mathematical method, representation, reasoning or check that improved.

Even Better If (EBI)

I will name the fact or theorem, show the substitution or construction step and check whether the size, direction and units of the result are reasonable.

Set one precise next-step action and test it on a fresh question.

Extension route

Choose this route only after the core evidence is secure.

Stretch

A scale plan measures 6 cm by 4 cm at 1:100. Find the real floor area in m^2 .

Deep challenge

Two solids have identical front and side elevations. Must their plans be identical? Explain with an example.

Explain your reasoning clearly enough that another learner could check it.