

2D Space & Structures: Transformations, Units, Area, Angles & the Cartesian Plane

Explicit teaching — I Do (~15 min)

Broad component (WA6MMGTW1–TW5). Plan as a 4–5 lesson sub-sequence, one focus per session.

1. Transformations [WA6MMGTW1](#)

Demonstrate slide (translation), flip (reflection) and turn (rotation) with a cut-out shape on the visualiser.

2. Unit conversion [WA6MMGTW2](#)

Show $1\text{ m} = 100\text{ cm}$, $1\text{ km} = 1000\text{ m}$ using the decimal/place-value link; extend to $g \leftrightarrow kg$ and $mL \leftrightarrow L$.

3. Area of rectangles [WA6MMGTW3](#)

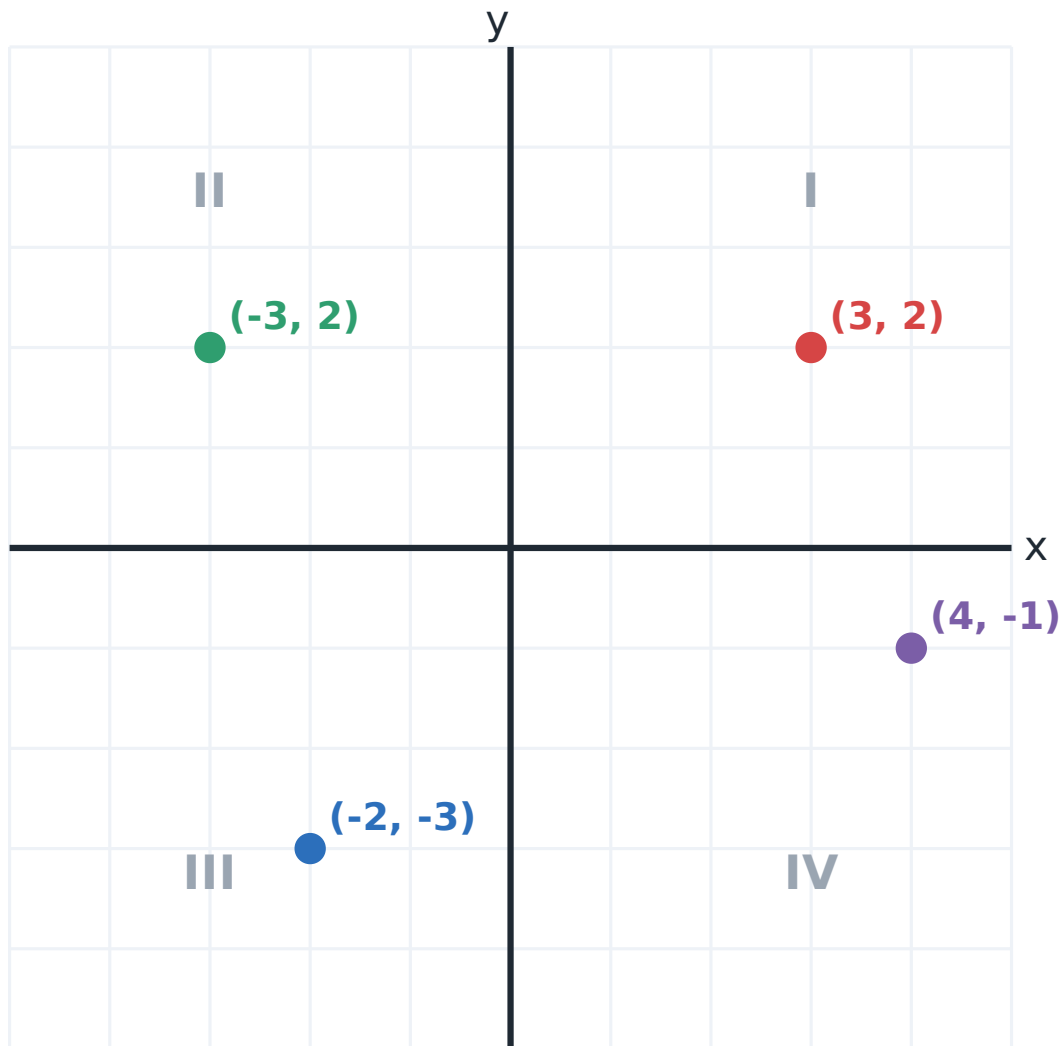
Build the rule by covering a rectangle with unit squares \rightarrow length \times width; record the steps.

4. Angles [WA6MMGTW4](#)

Worked example. Right angle = 90° , straight line = 180° , angles at a point = 360° . If one angle on a straight line is 115° , the other is $180 - 115 = 65^\circ$. Vertically opposite angles are equal.

5. Cartesian plane [WA6MMGTW5](#)

The Cartesian Plane - Four Quadrants



Two number lines crossing at zero create four quadrants.

Plot points in all four quadrants and read coordinates as (x, y) — across first, then up or down.

Guided practice — We Do (~20 min)

1. **Transform it.** The class transforms a shape on a grid — translate 3 right and 2 down, reflect over a line, rotate a quarter-turn — and describes each.
2. **Convert together.** Work a set of length/mass/capacity conversions, verbalising the \times/\div by 10, 100 or 1000.
3. **Area.** Find the area of several rectangles, then tackle a "find the missing side given the area" problem.
4. **Angles.** Find unknown angles using right-angle, straight-line and vertically-opposite relationships.

5. **Plot.** Plot a set of coordinates that join to make a shape across all four quadrants.

Independent practice — You Do (~15 min)

Worksheet (sections map to *WA6MMGTW1–TW5*):

- describe and perform translations, reflections and rotations on a grid;
- convert between metric units of length, mass and capacity;
- calculate the area of rectangles (including a missing-side problem);
- find unknown angles and explain the reasoning;
- plot and name points in all four quadrants.

Exit ticket. Plot $(-3, 2)$. Convert 2.5 km to metres. Find the area of a $6\text{ cm} \times 4\text{ cm}$ rectangle.

Teacher notes

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Curriculum links: *WA6MMGTW1–TW5*. The largest geometry component — spread across 4–5 sessions.

Materials: cut-out shapes or pattern blocks, mirrors, protractors, grid paper, four-quadrant grids, rulers, metric conversion charts.

Suggested split

- **TW1** transformations; **TW2** unit conversion; **TW3** area; **TW4** angles; **TW5** Cartesian plane.

Common misconceptions

- Confusing reflection and rotation.
- Multiplying or dividing by 10 instead of the correct power when converting (e.g. $m \rightarrow cm$ is $\times 100$).
- Reading coordinates as (y, x) .
- Assuming all angles on a line are 90° .

Assessment for learning: a quick protractor check and a "plot & name the point" mini-task each session.

Approaches

VISUAL · VISUAL-SPATIAL APPROACH

Visual-spatial approach

Lean on visual and spatial tools, since this component is inherently geometric.

Transformations. Use mirrors for reflections and tracing paper pinned at a point for rotations, so the motion is seen directly.

Conversion staircase. A colour-coded "metric staircase" ($km - m - cm - mm$) where each step is $\times 10$ or $\div 10$; students physically step up and down.

Area. Overlay transparent unit-square grids on rectangles before introducing the formula.

Angles. Colour vertically-opposite pairs the same colour on a diagram so the equality is obvious.

Cartesian plane. Project a large four-quadrant grid and use a moving dot to show how (x, y) locates a point.

Kinesthetic & Tech: Move It, Map It

This approach gets students physically moving across a giant coordinate grid and then capturing their work with simple technology. It suits active learners and those who enjoy digital tools.

Human coordinate grid. Lay a large grid on the floor (tape or playground chalk) with labelled axes. Call out coordinates and students walk to the correct spot. Then call a transformation — “translate 3 right” or “reflect in the y -axis” — and they step to their new positions.

Body angles. Students use their arms to make acute, right, obtuse and reflex angles on command, then pair up to form vertically opposite angles and check they are equal.

Tech capture. Using free interactive geometry software or a drawing app on tablets, students recreate a transformation they performed on the floor, drag the shape, and watch the coordinates update. They screenshot before and after to annotate.

Area scavenger hunt. With tape measures, groups find rectangular surfaces around the room (a desk, a window, a noticeboard), measure them and calculate area and perimeter, then rank them.

Why it works. Walking a translation or forming an angle with your body makes abstract geometry memorable, while the technology lets students test ideas and instantly see the effect of a move on the coordinates.