

GEOMETRY AND MEASURES

Geometrical reasoning

Pupils should learn to:	As outcomes, Year 7 pupils should, for example:
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Understand congruence and similarity

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GEOMETRY AND MEASURES

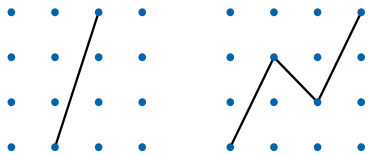
Geometrical reasoning

As outcomes, Year 8 pupils should, for example:

Congruence

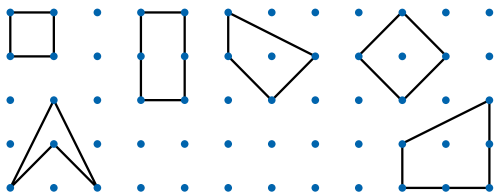
Know that if two 2-D shapes are **congruent**, they have the same shape and size, corresponding sides are equal and corresponding angles are equal. For example:

- From a collection of different triangles or quadrilaterals, identify those that are congruent to each other by placing one on top of the other. Realise that corresponding sides are equal and corresponding angles are equal.
- Divide a 4 by 4 pinboard into two congruent halves. How many different ways of doing this can you find?



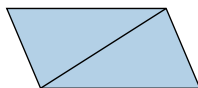
Divide the pinboard into four congruent quarters.

- Divide a 5 by 5 pinboard into two non-congruent halves.
- Using a 3 by 3 pinboard, make some different triangles or quadrilaterals. For each shape, investigate whether you can produce one or more identical shapes in different positions or orientations on the board. Describe the transformation(s) you use to do this.



Extend to 3 by 4 and larger grids.

- Two congruent scalene triangles without right angles are joined with two equal edges fitted together.



What shapes can result?
 What if the two triangles are right-angled, isosceles or equilateral?
 In each case, explain how you know what the resultant shapes are.

As outcomes, Year 9 pupils should, for example:

Congruence

Appreciate that when two shapes are congruent, one can be mapped on to the other by a translation, reflection or rotation, or some combination of these transformations.

See Year 8 for examples.

Link to transformations (pages 202–17).

Know from experience of constructing them that triangles satisfying SSS, SAS, ASA or RHS are unique, but that triangles satisfying SSA or AAA are not.

Link to constructions (pages 220 to 4-223).

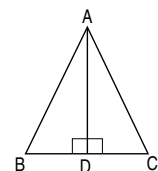
Appreciate that two triangles will be congruent if they satisfy the same conditions:

- three sides are equal (SSS);
- two sides and the included angle are equal (SAS);
- two angles and a corresponding side are equal (ASA);
- a right angle, hypotenuse and side are equal (RHS).

Use these conditions to deduce properties of triangles and quadrilaterals.

For example:

- Draw triangle ABC, with $AB = AC$. Draw the perpendicular from A to BC to meet BC at point D.



Show that triangles ABD and ACD are congruent. Hence show that the two base angles of an isosceles triangle are equal.

- Use congruence to prove that the diagonals of a rhombus bisect each other at right angles.
- By drawing a diagonal and using the alternate angle property, use congruence to prove that the opposite sides of a parallelogram are equal.