As outcomes, Year 8 pupils should, for example:

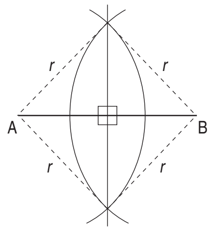
Use vocabulary from previous year and extend to:
bisect, bisector, mid-point… equidistant…
straight edge, compasses… locus, loci…

In work on construction and loci, know that the shortest distance from point P to a given line is taken as the distance from P to the nearest point N on the line, so that PN is perpendicular to the given line.

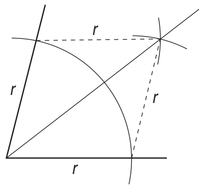
Use straight edge and compasses for constructions.

Recall that the diagonals of a rhombus bisect each other at right angles and also bisect the angles of the rhombus. Recognise how these properties, and the properties of isosceles triangles, are used in standard constructions.

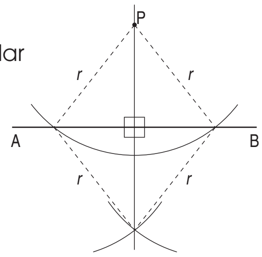
- Construct the mid-point and perpendicular bisector of a line segment AB.



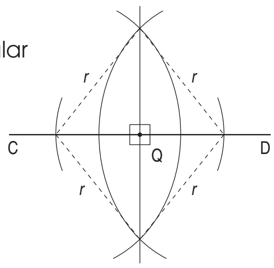
- Construct the bisector of an angle.



- Construct the perpendicular from a point P to a line segment AB.



- Construct the perpendicular from a point Q on a line segment CD.



Know that:
- The perpendicular bisector of a line segment is the locus of points that are equidistant from the two end points of the line segment.
- The bisector of an angle is the locus of points that are equidistant from the two lines.

Link to loci (pages 224–7) and properties of a rhombus (pages 186–7), and to work in design and technology.

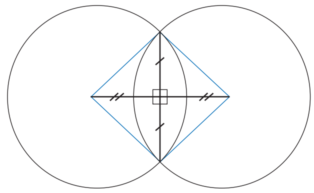
As outcomes, Year 9 pupils should, for example:

Use vocabulary from previous years and extend to:
circumcircle, circumcentre, inscribed circle…

Use straight edge and compasses for constructions.

Understand how standard constructions using straight edge and compasses relate to the properties of two intersecting circles with equal radii:

- The common chord and the line joining the two centres bisect each other at right angles.
- The radii joining the centres to the points of intersection form two isosceles triangles or a rhombus.

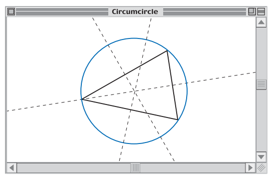


Use congruence to prove that the standard constructions are exact.

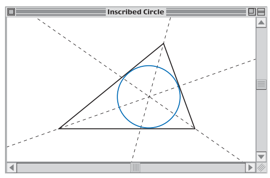
Use construction methods to investigate what happens to the angle bisectors of any triangle, or the perpendicular bisectors of the sides. For example:

- Observe the position of the centres of these circles as the vertices of the triangles are moved.

Construct a triangle and the perpendicular bisectors of the sides. Draw the circumcircle.



Construct a triangle and the angle bisectors. Draw the inscribed circle.



Link to properties of a circle (pages 194–7), and to work in design and technology.

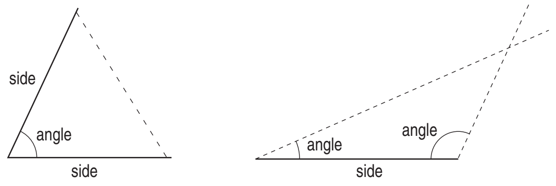
Pupils should be taught to:

Construct lines, angles and shapes (continued)

As outcomes, Year 7 pupils should, for example:

Construct triangles.
Use ruler and protractor to construct triangles:

- given two sides and the included angle (SAS);
- given two angles and the included side (ASA).



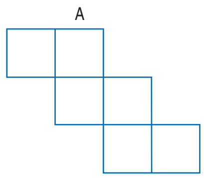
For example:

- Construct ΔABC with ∠A = 36°, ∠B = 58° and AB = 7 cm.
- Construct a rhombus, given the length of a side and one of the angles.

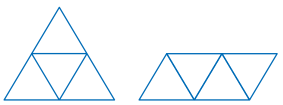
See Y456 examples (pages 102–3).

Construct solid shapes. Use ruler and protractor to construct simple nets. For example:

- Look at this net of a cube.
  When you fold it up, which edge will meet the edge marked A?
  Mark it with an arrow.



- Imagine two identical square-based pyramids.
  Stick their square faces together.
  How many faces does your new shape have?
- Construct on plain paper a net for a cuboid with dimensions 2 cm, 3cm, 4cm.
- Construct the two possible nets of a regular tetrahedron, given the length of an edge.



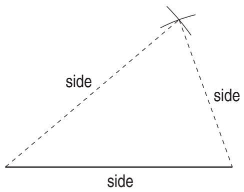
As outcomes, Year 8 pupils should, for example:

Construct triangles.
Construct triangles to scale using ruler and protractor, given two sides and the included angle (SAS) or two angles and the included side (ASA).

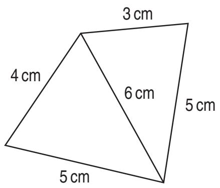
- A tower is 30 metres high.
  It casts a shadow of 10 metres on the ground.
  Construct a triangle to scale to represent this.
  Using a protractor, measure the angle that the light from the sun makes with the ground.

Extend to constructions with straight edge and compasses. For example:

- Construct a triangle given three sides (SSS).



- Construct this quadrilateral.



Link to scale drawings (pages 216–17).

Construct nets of solid shapes. For example:

- Construct a net for a square-based pyramid given that the side of the base is 3 cm and each sloping edge is 5cm.

As outcomes, Year 9 pupils should, for example:

Construct triangles.
Use the method for constructing a perpendicular from a point on a line to construct triangles, given right angle, hypotenuse and side (RHS). For example:

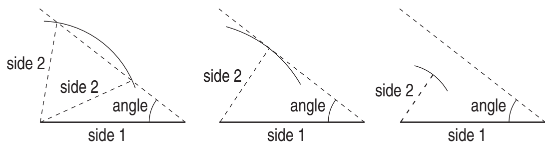
- A 10 metre ladder rests against a wall with its foot 3 metres away from the wall.
  Construct a diagram to scale. Then use a ruler and protractor to measure as accurately as possible:
  a. how far up the wall the ladder reaches;
  b. the angle between the ladder and the ground.

Review methods for constructing triangles given different information. For example:

- Is it possible to construct triangle ABC such that:
  a. A = 60°, B = 60°, C = 60°
  b. BC = 6 cm, AC = 4cm, AB = 3cm
  c. BC = 7cm, AC = 3cm, AB = 2cm
  d. A = 40°, B = 60°, AB = 5cm
  e. A = 30°, B = 45°, AC = 6cm
  f. BC = 8cm, AC = 6cm, C = 50°
  g. BC = 7cm, AC = 5.5cm, B = 45°
  h. BC = 7cm, AC = 4.95cm, B = 45°
  i. BC = 7cm, AC = 4cm, B = 45°
  j. BC= 6cm, AC = 10cm, B = 90°?

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

To specify a triangle three items of data about sides and angles are required. In particular:
- Given three angles (AAA) there is no unique triangle, but an infinite set of similar triangles.
- Given three sides (SSS) a unique triangle can be drawn, provided that the sum of the two shorter sides is greater than the longest side.
- Given two angles and any side (AAS), a unique triangle can be drawn.
- Given two sides and an included angle (SAS), a unique triangle can be drawn.
- If the angle is not included between the sides (SSA), there are three cases to consider:
  i. the arc, of radius equal to side 2, cuts side 3 in two places, giving two possible triangles, one acute-angled and the other obtuse-angled;
  ii. the arc touches side 3, giving one right-angled triangle (RHS);
  iii. the arc does not reach side 3 so no triangle is possible.



Link to congruence and similarity (pages 190–3).