Mathematics	**Y10 Foundation**	Chapter 15 (N12, N13, A5, R1, R9, R10, R11, R13, R16, G14)	**The Bigger Picture: Constructions**	**Lessons 22**

Essential Knowledge	**Teaching Points**
• Understand clockwise and anticlockwise; • Draw circles and arcs to a given radius or given the diameter; • Measure and draw lines, to the nearest mm; • Measure and draw angles, to the nearest degree; • Know and use compass directions; • Draw sketches of 3D solids; • Know the terms face, edge and vertex; • Identify and sketch planes of symmetry of 3D solids; • Make accurate drawings of triangles and other 2D shapes using a ruler and a protractor; • Construct diagrams of everyday 2D situations involving rectangles, triangles, perpendicular and parallel lines; • Understand and draw front and side elevations and plans of shapes made from simple solids; • Given the front and side elevations and the plan of a solid, draw a sketch of the 3D solid • Understand congruence, as two shapes that are the same size and shape; • Visually identify shapes which are congruent; • Use straight edge and a pair of compasses to do standard constructions: • understand, from the experience of constructing them, that triangles satisfying SSS, SAS, ASA and RHS are unique, but SSA triangles are not; • construct the perpendicular bisector of a given line; • construct the perpendicular from a point to a line; • construct the bisector of a given angle; • construct angles of 90°, 45°; • Draw and construct diagrams from given instructions, including the following: • a region bounded by a circle and an intersecting line; • a given distance from a point and a given distance from a line; • equal distances from two points or two line segments; • regions may be defined by 'nearer to' or 'greater than'; • Find and describe regions satisfying a combination of loci; • Use constructions to solve loci problems (2D only); • Use and interpret maps and scale drawings; • Estimate lengths using a scale diagram; • Make an accurate scale drawing from a diagram;	• This is a very practical topic, and provides opportunities for some hands-on activities. • Drawing 3D shapes in 2D using isometric grids isn't an explicit objective but provides an ideal introduction to the topic and for some students provides the scaffolding needed when drawing 3D solids. • Whilst not an explicit objective, it is useful for students to draw and construct nets and show how they fold to make 3D solids, allowing students to make the link between 3D shapes and their nets. This will enable students to understand that there is often more than one net that can form a 3D shape. • Drawings should be done in pencil. • Relate loci problems to real-life scenarios, including mobile phone masts and coverage. • Students must understand that construction lines should not be erased.

- Use three-figure bearings to specify direction;
- Mark on a diagram the position of point *B* given its bearing from point *A*;
- Give a bearing between the points on a map or scaled plan;
- Given the bearing of a point *A* from point *B*, work out the bearing of *B* from *A*;
- Use accurate drawing to solve bearings problems;
- Solve locus problems including bearings

Assumed Prior Knowledge/ Links / Interleaving

- Students should be able to measure and draw lines
- Be able to estimate the size of given angles.
- Students should remember angle facts including rules for angles in parallel lines
- Students should be able to apply knowledge of ratio to scale drawings

Potential Barriers to Access /Misconceptions	**Opportunities for Reasoning/Problem Solving/Proofs**
• Some pupils may use the wrong scale of a protractor. For example, they measure an obtuse angle as 60° rather than as 120°. • Often 5 sides only are drawn for a cuboid • Confusion between plan, side and front elevations • Bearings must all be three figure numbers	• Use bearings in a real-life context to describe the bearing between two towns on a map • Interpreting scale drawings and maps involving lengths that need to be measured (rather than given in the problem). • Link problems with other areas of mathematics, such as the trigonometric ratios and Pythagoras' Theorem • Relate loci problems to real-life scenarios, including mobile phone masts and coverage.

Key Mathematical Vocabulary	Construct, circle, arc, sector, face, edge, vertex, two-dimensional, three-dimensional, solid, elevations, congruent, angles, regular, irregular, bearing, degree, bisect, perpendicular, loci, map, scale, plan, region