The Sutton Academy

Knowledge Rich Curriculum Plan

Year 11 Higher – Geometry 1

Lesson/Learning Sequence	Intended Knowledge: *Students will know that…*	Tiered Vocabulary	Steps To Success	Prior Knowledge: *In order to know this, students need to already know that…*	Feedback
To learn how to calculate interior and exterior angles	• Students will know how to calculate the size of an interior angle for a regular or irregular polygon using the formula for the sum of the interior angles: $(n-2)\times 180$ • Students will know how to calculate the size of an exterior angle of a polygon using the calculation 360/number of sides. • Students will know that the interior and exterior angle add to 180 • Students will know how to apply the rules for finding interior and exterior angles to solve multi-step problems involving both regular and irregular polygons • Students will know how to determine the number of sides for a polygon using the exterior angle	**Interior** – Inside **Exterior** – Outside **Exterior angle** – is the angle between a side of a polygon and an extended adjacent side. **Polygon** – a closed shape with straight sides **Regular Polygon** – A polygon where all sides are the same length and all angles are equal **Irregular Polygon** – A polygon where all sides are the same length and all angles are not equal **Tesselate –** fit together without gaps or overlapping.	**Steps to Success – Interior angles of a regular polygon** **Step 1:** Check that you shape is regular. Does it have equal sides and equal angles? **Step 2:** Calculate the sum of the interior angles by using the formula: $Sum\ of\ the\ interior\ angles = (n-2)\times 180$ Where, n, is the number of sides. **Step 3:** Divide this sum by how many equal angles the polygon has. **Steps to Success – Missing angle of an irregular polygon** **Step 1:** Check that you shape is irregular. Not all the sides or angle are equal. **Step 2:** Calculate the sum of the interior angles by using the formula: $Sum\ of\ the\ interior\ angles = (n-2)\times 180$ Where, n, is the number of sides. **Step 3:** Add up all the known angles. **Step 4:** Subtract the sum of the known angles from the sum of the interior angles to find the missing angle.	• Students need to know the basic angle facts • Students need to know how to calculate missing angles in triangles and quadrilaterals	•
To learn how to find missing angles in parallel lines	• Students will know how to identify alternate, corresponding and co-interior angles • Students will know that corresponding angles are equal • Students will know that alternate angles are equal • Students will know that co-interior angles add to 180 • Students will know how to find missing angles in parallel lines and give clear reasons for their answers	**Parallel –** parallel lines are two lines that are side by side and have the same distance continuously between them **Isosceles Triangle –** a triangle with two equal sides and two equal angles **Corresponding –** matching	**Alternate angles** **Alternate angles** are two angles, formed when a line crosses two other lines, that lie on opposite sides of the **transversal** line and on opposite relative sides of the other lines. If the two lines crossed are parallel, the alternate angles are equal. **Alternate angles** are equal.  **Corresponding angles**	• Students should already know that vertically opposite angles are equal • Students should already know how to calculate missing angles in triangles, including equilateral and isosceles triangles • Students should already know that angles on a straight line add to 180	•

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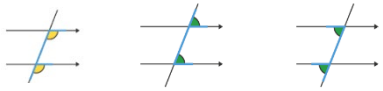
		Co-interior Angles – angles that lie between two lines and on the same side of a transversal **Transversal –** a line that crosses at least two other lines	**Corresponding angles** are angles that occur on the same side of the transversal line and are equal in size. They are either both obtuse or both acute. **Corresponding** means matching. **Corresponding angles** are equal.  **Co-interior angles** **Co-interior angles** are angles on the same side of the **transversal** and inside the parallel lines. The two angles that occur on the same side of the transversal always add up to 180º. **Co-interior** angles add up to 180º.		
To learn how to measure and draw bearings	• Students will know the rules for bearings; 1) Always measure from North 2) Bearings must be written as 3 digits. 3) Always measure in a clockwise direction. • Students will know how to use a protractor to accurately draw bearings from A to B and B to A. • Students will know how to use a protractor and ruler to accurately measure bearings on a map, including measuring from A to B and B to A. • Students will know how to accurately draw and measuring bearings using a protractor to solve problems • Students will know how to use the angle properties of parallel lines to determine bearings	**Bearing –** angles, measured clockwise from north	**Steps to Success- Measuring bearings** **Step 1:** Draw a line connecting the two points unless this has been drawn for you. **Step 2:** Identify which point you are measuring the bearing **from.** **Step 3:** Place the protractors centre on the bottom of the line with 0 on the **North** line. **Step 4:** Measure the size of the angle, remembering to measure **clockwise.** Step 5: Record your bearing, ensuring it has 3 digits. If the angle is less than 100, place a zero as the first digit. **Steps to Success- Drawing bearings** **Step 1:** Identify which point you are drawing the bearing **from.** **Step 2:** Draw the North line at that point unless it has been drawn for you. **Step 3:** Place the protractors centre on the bottom of the line with 0 on the **North** line. **Step 4:** Measure the angle in the question, remembering that bearings are measured **clockwise**. **Step 5:** Make a marking at the position of the angle, then draw through the point to the required measurement as given in the	• Students should already know how to measure and draw angles • Students should know how to calculate angles in parallel lines using the fact that co-interior angles add to 180	•

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			question.		
To learn how to construct angles and bisectors	• Students will know how to construct a perpendicular bisector of any given line • Students will know how to construct a perpendicular from a point to a line. • Students will know how to construct a bisector of any given angle. • Students will know how to accurately construct angles including 45° and 90°. • Students will know that the perpendicular distance from a point to a line, is the shortest distance to the line.	**Perpendicular –** at a right angle to **Bisect –** cut into two equal parts **Bisector –** A line that splits an angle or line into two equal parts	**Steps to Success- Constructing perpendicular bisectors** **Step 1: Use compasses to draw an arc.** Open the compasses to about three-quarters of the length of the line. Put the point of the compasses on one of the endpoints of the line. Draw an arc. **Step 2: Use the compasses to draw a second arc, intersecting the first arc.** Keeping the compasses, the same, draw another arc from the other end of the line. **Step 3: Join the two points where the arcs intersect.** Using a ruler, join up the two points where the arcs intersect each other. The new line is the perpendicular bisector of the original line segment *AB*. **Step 4: Check.** You can check that the new line goes through the midpoint of the line segment *AB* by using a ruler to measure. The line *AB* should have been cut into two equal halves. You can also check if the lines meet at a right angle. **Steps to Success- Constructing angle bisectors** **Step 1: Use compasses to draw an arc.** Set your compasses to a length that is less than the shortest line. Putting the point of the compasses on *B*, draw one arc going through both *AB* and *BC*. **Step 2: Use the compasses to draw two more arcs.** Put the point of the compasses on the point where the first arc crossed *AB* and draw an arc. Keep the compass on the same setting. Repeat by putting the point	• Students should already know how to measure the length of a line using a ruler	•

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			of the compasses on the point where the first arc crossed *BC* and draw an arc. These two arcs need to intersect. **Step 3: Join the vertex with the point where the arcs intersect.** Using a ruler, join up the point where the arcs intersect each other with the vertex *B*. The new straight line is the angle bisector of the original angle *ABC* and splits it into two equal parts. **Step 4: Check.** You can check that the new straight line bisects the angle *ABC* by using a protractor. **Steps to Success- Constructing a perpendicular line to a point** **Step 1: Draw two arcs crossing the line segment.** Put the point of the compasses on the original point *P*. Draw an arc that crosses the original line in two places. These are labelled *A* and *B*. **Step 2: Make two more arcs which intersect.** Put the point of the compasses on point *A* where an arc crosses the line and draw another arc. Keep the compasses on the same setting. Repeat with point *B*, drawing another arc to intersect the arc just drawn. • **Step 3: Join the point where the arcs intersect to the original point.** Using a ruler, join up the point where the arcs intersect each other and the original point *P*. The new line is perpendicular to the original line segment. The new line will have also bisected the length *AB* – this may not be true for all questions. **Step 4: Measure the line.** You may be asked to measure the shortest distance from the point to the line. To do this measure the line you have constructed.		

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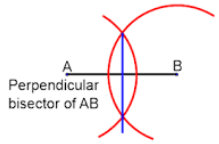
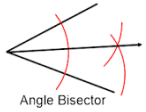
To learn how to construct loci	• Students will know how to construct a region bounded by a circle and an intersecting line. • Students will know how to construct a given distance from a point and given distance from a line. • Students will know how to construct equal distances from two points or two line segments. • Students will know how to construct regions which may define by 'nearer to' or 'greater than' • Students will know how to use the rules of loci to solve 2D loci problems. • Students will know how to solve loci problems involving the use of constructions; angle bisectors, perpendicular bisectors etc.	**Locus (Loci is the plural) –** the set of all points (usually forming a curve or surface) satisfying some condition **Equidistant –** an equal distance	**Loci – Key points:** • When 1 point is involved draw a circle/arc e.g. more than 4cm away from C  • When 2 points are involved draw a perpendicular bisector e.g. closer to A than B  • When 2 sides are involved draw an angle bisector e.g. closer to AB than BC  • When 1 side is involved draw a straight line e.g. more than 3cm away from AC 	• Students need to know how to construct a perpendicular bisector of any given line • Students need to know how to construct a bisector of any given angle.	•