Quality of Education: *Curriculum is planned and sequenced so that new **knowledge** and **skills** build on what has been taught before and towards its clearly defined end points.*

Ormiston Victory Academy

SUBJECT: Geometry	**CURRICULUM PROGRESSION PATHWAYS**	**CL: Miss Z. Bradshaw and Miss A. Hazell**					
Year 7	**Year 8**	**Year 9**	**KS4 Foundation pathway**	**KS4 Higher pathway**	KS5 (Level 3)	Further Education and training	Careers
2D Shapes • Identify and name different triangles and quadrilaterals • Work out the perimeter of composite shapes and polygons • Find areas of irregular shapes by counting squares • Calculate areas of rectangles and rectilinear shapes **3D Shapes** **Angles** • Use a protractor to measure and draw angles • Recognise types of angles • Estimate the size of angles • Identify angle and side properties for triangles • Use rules for angles on a straight line,	**2D Shapes** • Name different polygons and how to classify them • Derive and use the formula for area of triangle • Calculate the area of compound shapes made up of triangles and rectangles • Derive and use the formula for area of parallelograms and trapeziums **3D Shapes** • Classify and name 3D shapes using correct language • Calculate the volume of cubes and cuboids • Calculate the volume of composite 3D shapes made up of cubes and cuboids	**2D Shapes** **3D Shapes** • Calculate the volume and surface area of a right prism and cylinder **Angles** **Constructions, loci and bearings** **Pythagoras and trigonometry** • Explore and apply Pythagoras theorem to find missing sides in a right angle triangle • Apply metric conversions of area and volume to volume and surface area problems • Explore naming sides of right angle triangles • Derive and use the sin, cosine and tangent ratios to find missing angles and unknown sides	**2D Shapes** • Identify parallel and perpendicular lines • Find missing lengths given the area for a variety of 2D shapes • Solve area and perimeter problems that involve converting units of measure • Calculate areas in hectares and convert between hectares and meters squared **3D Shapes** • Calculate the surface area and volume of any prism • Identify and sketch planes of symmetry in 3D shapes • Interpret plans and elevation drawings • Find the volume and	**2D Shapes** • Identify parallel and perpendicular lines • Find missing lengths given the area for a variety of 2D shapes • Solve area and perimeter problems that involve converting units of measure • Calculate areas in hectares and convert between hectares and meters squared **3D Shapes** • Calculate the surface area and volume of any prism • Find the volume and surface area of cones, spheres, pyramids and composite 3D solids • Work backwards to find missing	**2D + 3D Shapes** • Apply formulas for area and volume in different contexts • Use a variety of estimation techniques in context, creating working models for: populations, land to sea ratio's or in manufacturing/production planning (Core Maths) • Complete proofs and solve equations using trigonometric identities (A-level) **Angles, Measures, Pythagoras and trigonometry** • Drawing accurate force diagrams (A-level) • Work with maps, scale drawings and bearings • Use Pythagoras' theorem working with lengths and distances • Use angle rules with mechanical modelling, force diagrams and with calculations of vector quantities (A-level) • Using exact trigonometric ratios (A-level) • Use sine and cosine rules to solve geometric problems with triangles(A-level) • Use double angle and compound angle	• Natural Sciences • Engineering • Graphics/Product Design • Any courses requiring problem solving	Actuarial Science • Aeronautical Engineering • Chemical Engineering • Civil Engineering • Economics • Electrical/Electronic Engineering • Engineering (General) • Mathematics • Mechanical Engineering • Physics • Statistics • Food/Manufacturing • Logistics • Factory product design and production planning • Architecture • Sound engineer

Core knowledge and skills mapped across the curriculum

Quality of Education: *Curriculum is planned and sequenced so that new **knowledge** and **skills** build on what has been taught before and towards its clearly defined end points.*

Ormiston Victory Academy

vertically opposite and around a point to solve problems • Use the rule for angles in a tringle to solve problems involving interior and exterior angles • Use the sum of angles in a quadrilateral to solve interior and exteriors angle problems for quadrilaterals **Constructions, loci and bearings** • Use a ruler and protractor to draw triangles articulately **Pythagoras and trigonometry** **Transformations, vectors and congruency** • Identify congruent shapes • Describe and perform enlargements with only scale factor (no centre) • Recognise lines of symmetry and rotation	• Sketch the nets of 3D solids accurately • Draw 3D solids on isometric paper • Draw plans and elevations of 3D solids • Calculate the surface area of cubes and cuboids **Angles** • Use the properties of special quadrilaterals to solve angle problems • Introduction to parallel line notation and concept • Identify alternate and corresponding angles on a diagram and use facts to solve missing angle problems in parallel lines • Calculate the sum of interior and exterior angles in a polygon	**Transformations, vectors and congruency** • Enlarge a 2D shape with a centre of enlargement • Find the centre of enlargement by drawing lines on grid • Understand that the scale factor is the ratio between the corresponding lengths • Enlarge 2D shape by using negative integers and fractional scale factors • Use congruent shapes to solve problems involving triangles and other polygons • Work out if shapes are similar, congruent or neither • Solve problems involving similar triangles **Measures**	surface area of cones, spheres, pyramids and composite 3D solids **Angles** • Derive and apply the formula for sum of interior angles in any regular or irregular polygon and use this to find missing angles • Explore and understand angle proofs about triangles **Constructions, loci and bearings** • Accurately draw angles and 2D shapes using a ruler, protractor and compasses • Construct a polygon inside a circle • Bisect angles and lines using compasses and rulers • Find the shortest distance from a point to a line	values for the above **Angles** • Derive and apply the formula for sum of interior angles in any regular or irregular polygon and use this to find missing angles • Explore and understand angle proofs about triangles • Derive and use the fact that the exterior angle of a triangle is equal to the sum of the two opposite interior angles • Derive and apply the formula for sum of interior angles in any regular or irregular polygon and use this to find missing angles **Constructions, loci and bearings** • Accurately draw angles and 2D shapes using a ruler, protractor and compasses	formulae to complete proofs and solve equations (A-level) • Draw and use graphs of sine, cosine and tangent to find all solutions to trigonometric equations. (A-level) • Graphs of reciprocal trigonometric functions and their domains and ranges (A-level) • Use reciprocal trigonometric functions to solve equations(A-level) • Use inverse trigonometric functions and their domains and ranges(A-level) • Work interchangeably with degrees and radians(A-level) • Use radians to work out areas of sectors and segments(A-level) • Small angle approximations(A-level) • Modelling with trigonometric functions in context(A-level) **Circles** • Identify and use parts of circles with formulas for area and volume. • Apply circle theorems to solve geometric problems (A-level)		

Core knowledge and skills mapped across the curriculum

Quality of Education: *Curriculum is planned and sequenced so that new **knowledge** and **skills** build on what has been taught before and towards its clearly defined end points.*

Ormiston Victory Academy

symmetry in 2D shapes • Identify refection symmetry in 3D shapes • Carry out reflections in a mirror line, including on a coordinate grid • Describe a reflection on a coordinate grid • Describe and perform rotations on a coordinate grid • Perform and describe translations using instruction, not vectors • Perform a combination of transformations on 2D shapes **Measures** • Compare measurements by converting them to the same units (metric) • Solve simple problems involving units of measurements	• Work out the sizes of interior and exterior angles in a polygon • Develop reasoning skills including using angle notation and correct definitions • Form equations to find missing angles **Constructions, loci and bearings** **Pythagoras and trigonometry** **Transformations, vectors and congruency** **Measures** • Converting units of measures for area, volume and capacity • Know rough equivalences between metric and imperial units **Circles**	• Calculate with compound measures (speed, density and pressure) • SOLVE PROBLEMS USING CONSTANT RATES AND RELATED FORMULA **Circles** • Explore parts of a circle and define key parts • Derive and use formulae for area and circumference of a circle and calculate leaving your answer in terms of pi	• Draw loci and identify regions bound by loci • Find and use 3 figure bearings • Use angles in parallel lines to work out bearings • Solve problems involving bearings and scale diagrams **Pythagoras and trigonometry** • Calculate the length of a line segment using Pythagoras • Know and use exact trigonometric values • Combine Pythagoras and trigonometry to complex problems **Transformations, vectors and congruency** • Translate shape on coordinate grid suing a column vector • Describe combination of transformations • Identify and use the four	• Construct a polygon inside a circle • Bisect angles and lines using compasses and rulers • Find the shortest distance from a point to a line • Draw loci and identify regions bound by loci • Find and use 3 figure bearings • Use angles in parallel lines to work out bearings • Solve problems involving bearings and scale diagrams **Pythagoras and trigonometry** • Find angles of elevation and depression • Recall and use exact trig values • Calculate the length of a line segment using Pythagoras • Combine Pythagoras and trigonometry to	**Transformations, vectors and congruency** • Use column vectors and unit vectors interchangeably(A-level) • Calculate magnitude and direction of vectors (A-level) • Use vectors to solve geometric problems(A-level) • Use vectors in speeds and distance calculations(A-level) • Use vectors in 3D(A-level) • Use vectors in mechanics (A-level) • Describe links between trigonometric graphs using transformation(A-level) • Draw and describe affects of translation, reflections and stretches to graphs and their equations(A-level) • Combining multiple dependent and independent transformation(A-level)		

Core knowledge and skills mapped across the curriculum

in the context of length, mass and capacity • Convert between metric units of length, mass and capacity • Use scale diagrams • Read scales on measuring equipment • Choose suitable units to estimate length and areas • Use metric and imperial units **Circles**			triangle congruency rules from a given description • Understand similarity and use it to solve angle problems • Use similarity to solve angle problems and find missing lengths • Determine when two shapes are definitely not (or may not be) similar • Calculate perimeters of similar shapes • Use congruency to work out unknown angles and sides • Perform column vector arithmetic • Identify column vectors that are parallel • Perform vector arithmetic and represent the solutions graphically	complex problems • Know and use the graphs of sine/cosine and tangent • Know how to use both a calculator and the graph to find sine/cosine or tangent of any angle • Derive and use the formula for area of triangle using sine • Use the above formula to calculate the area of a segment of a circle • Derive and use the sine and cosine rule to find missing lengths and angles • Solve bearings problems using all trigonometry • Use Pythagoras and trigonometry in 3D • Recognise how changes in functions effect trigonometric graphs			

Quality of Education: *Curriculum is planned and sequenced so that new **knowledge** and **skills** build on what has been taught before and towards its clearly defined end points.*

			Measures • Draw diagrams to scale **Circles** • Work out the radius or diameter of a circle given the circumference or area of a circle • Calculate areas and perimeter of sectors of circles	**Transformations, vectors and congruency** • Translate shape on coordinate grid suing a column vector • Describe combination of transformations • Describe an enlargement with a negative scale factor • Identify and use the four triangle congruency rules from a given description • Understand similarity and use it to solve angle problems • Use similarity to solve angle problems and find missing lengths • Determine when two shapes are definitely not (or may not be) similar • Calculate perimeters of similar shapes			

Core knowledge and skills mapped across the curriculum

Quality of Education: *Curriculum is planned and sequenced so that new **knowledge** and **skills** build on what has been taught before and towards its clearly defined end points.*

Ormiston Victory Academy

				• Use congruency to work out unknown angles and sides • Perform column vector arithmetic • Identify column vectors that are parallel • Draw vectors • Prove shapes are congruent • Find similar length, areas and volumes • Understand and use vector notation • Work out the magnitude of a vector • Perform vector arithmetic and represent the solutions graphically • Identify when vectors are parallel and find the resultant of two vectors • Use the resultant of two vectors to solve vector problems			

Core knowledge and skills mapped across the curriculum

Quality of Education: *Curriculum is planned and sequenced so that new **knowledge** and **skills** build on what has been taught before and towards its clearly defined end points.*

				• Express points as position vectors • Prove that lines are parallel or points are colinear • Solve geometric problems involving vectors and given ratios **Measures** • Draw diagrams to scale • Calculate rates • Convert between metric units of speed • Use a formula to calculate speed and acceleration **Circles** • Work out the radius or diameter of a circle given the circumference or area of a circle • Calculate areas and perimeter of sectors of circles • Calculate areas and perimeter of			

Core knowledge and skills mapped across the curriculum

Quality of Education: *Curriculum is planned and sequenced so that new **knowledge** and **skills** build on what has been taught before and towards its clearly defined end points.*

Ormiston Victory Academy

				sectors of circles			

Core knowledge and skills mapped across the curriculum