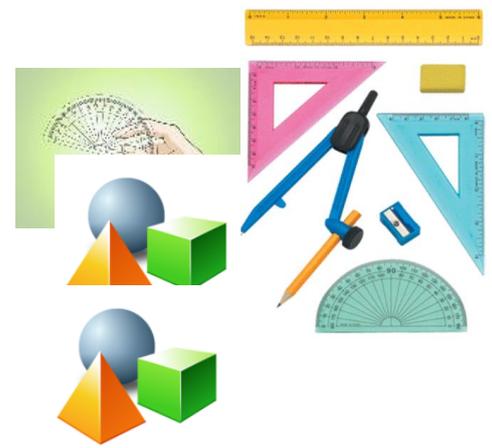**Y11 Unit 2 Overview-Shape: Angles, construction and Measures**

Target grade for tests:

You will learn about:

- 2D and 3D shapes.
- Angles.
- Reflection, rotation and translation.
- Units of measurement.
- Perimeter, Area and Volume.

You will be able to:

- Use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries.
- Use the standard conventions for labelling and referring to the sides and angles of triangles.
- Draw diagrams from written description.
- Identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres.
- Derive and apply the properties and definitions of: special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus; and triangles and other plane figures using appropriate language
- Calculate angles at a point, angles at a point on a straight line, vertically opposite angles.
- Communicate your methods verbally, using a range of mathematical vocabulary.
- Rotate, reflect and translate shapes.
- Use and change between standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)
- Calculate perimeters of shapes.
- Know and apply formulae to calculate area of triangles, parallelograms and trapezia.
- Calculate surface area and volume of cuboids.

Lesson Overview	**Key Words**
VISUALISING AND CONSTRUCTING	Refer to http://studymaths.co.uk/glossary.php for definitions of the key words
• Know the meaning of faces, edges and vertices.	Edge, Face, Vertex (Vertices)
• Use notation for parallel lines.	Plane
• Know the meaning of 'perpendicular' and identify perpendicular lines.	Parallel
• Know the meaning of 'regular' polygons.	Perpendicular
• Identify line and rotational symmetry in polygons.	Regular polygon
• Use AB notation for describing lengths.	Rotational symmetry
• Use ∠ABC notation for describing angles.	
• Use ruler and protractor to construct triangles from written descriptions.	**Notation**
• Use ruler and compasses to construct triangles when all three sides known.	The line between two points A and B is AB
	The angle made by points A, B and C is ∠ABC
INVESTIGATING ANGLES	The angle at the point A is Â
• Identify fluently angles at a point, angles at a point on a line and vertically opposite angles.	Arrow notation for sets of parallel lines
• Identify known angle facts in more complex geometrical diagrams.	Dash notation for sides of equal length
• Use knowledge of angles to calculate missing angles in geometrical diagrams.	Angle/ Degrees/ Protractor
• Know that angles in a triangle total 180°.	Right angle/ Acute angle/ Obtuse angle
• Find missing angles in triangles.	Reflex angle
• Find missing angles in isosceles triangles.	Vertically opposite
• Explain reasoning using vocabulary of angles.	Geometry, geometrical
	Notation
	Right angle notation/ Arc notation for all other angles
TRANSFORMATIONS	The degree symbol (°)
• Write the equation of a line parallel to the x-axis or the y-axis	(Cartesian) coordinates
	Axis, axes, x-axis, y-axis

- Draw a line parallel to the x-axis or the y-axis given its equation
- Identify the lines y = x and y = -x
- Draw the lines y = x and y = -x
- Carry out a reflection in a diagonal mirror line (45° from horizontal)
- Find and name the equation of the mirror line for a given reflection
- Describe a translation as a 2D vector
- Understand the concept and language of rotations
- Carry out a rotation using a given angle, direction and centre of rotation
- Describe a rotation using mathematical language

MEASURING AND UNITS
- Use a ruler to accurately measure line segments to the nearest millimetre
- Use a protractor to accurately measure angles to the nearest degree
- Convert fluently between metric units of length
- Convert fluently between metric units of mass
- Convert fluently between metric units of volume / capacity
- Convert fluently between units of time
- Convert fluently between units of money
- Solve practical problems that involve converting between units
- State conclusions clearly using the units correctly

CALCULATING PERIMETER AREA AND VOLUME
- Recognise that the value of the perimeter can equal the value of area
- Use standard formulae for area and volume
- Find missing lengths in 2D shapes when the area is known
- Know that the area of a trapezium is given by the formula area = ½ × (a + b) × h = $\left(\frac{a+b}{2}\right)h = \frac{(a+b)h}{2}$
- Calculate the area of a trapezium
- Understand the meaning of surface area
- Find the surface area of cuboids (including cubes) when lengths are known
- Find missing lengths in 3D shapes when the volume or surface area is known

Origin
Quadrant
Translation, Reflection, Rotation
Transformation
Object, Image
Congruent, congruence
Mirror line
Vector
Centre of rotation

Notation
Cartesian coordinates should be separated by a comma and enclosed in brackets (x, y)
Vector notation $\binom{a}{b}$ where a = movement right and b = movement up

Length, distance
Mass, weight
Volume
Capacity
Metre, centimetre, millimetre
Tonne, kilogram, gram, milligram
Litre, millilitre
Hour, minute, second
Inch, foot, yard
Pound, ounce
Pint, gallon
Line segment

Notation
Abbreviations of units in the metric system: m, cm, mm, kg, g, l, ml
Abbreviations of units in the Imperial system: lb, oz

Perimeter, area, volume, capacity, surface area
Square, rectangle, parallelogram, triangle, trapezium (trapezia)
Polygon
Cube, cuboid
Square millimetre, square centimetre, square metre, square kilometre
Cubic centimetre, centimetre cube
Formula, formulae
Length, breadth, depth, height, width

Notation
Abbreviations of units in the metric system: km, m, cm, mm, mm², cm², m², km², mm³, cm³, km³

Research	Note-making	Group work & discussion	Memorisation	Precision & accuracy	Independence	Reflection