

Y10 Unit 2 Overview-Shape: Angles, construction and Measures

Test Date: WB 20th January, 2020.

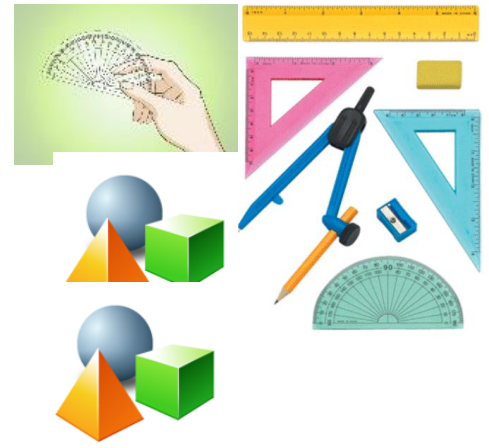
Target grade for tests:

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

VISUALISING AND CONSTRUCTING

- Know the meaning of faces, edges and vertices.
- Use notation for parallel lines.
- Know the meaning of 'perpendicular' and identify perpendicular lines.
- Know the meaning of 'regular' polygons.
- Identify line and rotational symmetry in polygons.
- Use AB notation for describing lengths.
- Use $\angle ABC$ notation for describing angles.
- Use ruler and protractor to construct triangles from written descriptions.
- Use ruler and compasses to construct triangles when all three sides known.

INVESTIGATING ANGLES

- Identify fluently angles at a point, angles at a point on a line and vertically opposite angles.
- Identify known angle facts in more complex geometrical diagrams.
- Use knowledge of angles to calculate missing angles in geometrical diagrams.
- Know that angles in a triangle total 180° .
- Find missing angles in triangles.
- Find missing angles in isosceles triangles.
- Explain reasoning using vocabulary of angles.

Key Words

Refer to <http://studymaths.co.uk/glossary.php> for definitions of the key words

Edge, Face, Vertex (Vertices)

Plane

Parallel

Perpendicular

Regular polygon

Rotational symmetry

Notation

The line between two points A and B is AB

The angle made by points A, B and C is $\angle ABC$

The angle at the point A is \hat{A}

Arrow notation for sets of parallel lines

Dash notation for sides of equal length

Angle/ Degrees/ Protractor

Right angle/ Acute angle/ Obtuse angle

Reflex angle

Vertically opposite

Geometry, geometrical

Notation

Right angle notation/ Arc notation for all other angles

The degree symbol ($^\circ$)

TRANSFORMATIONS

- Write the equation of a line parallel to the x-axis or the 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 $\text{area} = \frac{1}{2} \times (a + b) \times h$
 $= \left(\frac{a+b}{2}\right)h = \frac{(a+b)h}{2}$
- 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

(Cartesian) coordinates

Axis, axes, x-axis, y-axis

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 $\begin{pmatrix} a \\ b \end{pmatrix}$ 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

Suggested reading or support/ challenge available

Support is available from a Maths teacher in 'MORALE' in M1 daily from 1:30pm -1:45pm

www.mymaths.co.uk

login: penryn

password:

Cross curricular

SMSC:

- 1.1 Exploring, understanding and respecting cultural diversity e.g. exploration of different methods of multiplication (Chinese, Russian).
- 3.1 Developing personal qualities and using social skills (regular paired/ group work communication).
- 3.2 Participating, cooperating and resolving conflicts (paired/group activities).
- 4.2 Experiencing fascination, awe and wonder of mathematics.
- 4.4 Using imagination and creativity in learning.

vle.mathswatch.com/vle/

login: school username followed by
@penryn-college

password: **Penryn2016**

www.hegartymaths.com

Go to student login at the top... find your school, enter your details and then set up your password...

Use your revision guide

Use the code in the front of your guide to access your free online revision

www.justmaths.co.uk/online

login: PenrynStudent

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Literacy:

Verbal communication of understanding using key words in the correct context. Development of written communication of methods and strategies to problem solve.

NAC:

Science – Mathematical names of 3-D shapes. Make simple 3-D models from nets. Recognise 2-D representations of 3-D shapes. Use co-ordinates in the first quadrant. Understand angle as a measure of turn. Measure and draw angles. Know and use the formula for the area of a rectangle.

Technology- Make simple 3-D models from nets.

Art – Mathematical names of 3-D shapes. Identify all the symmetries of 2-D shapes.

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