



YEAR 9 Autumn TERM 2

'An ambitious curriculum that meets the needs of all'

Medium Term Planning

1. Three dimensional shapes. 2. Construction and congruency. 3. Numbers.

Curriculum Intent

UNIT: Three dimensional shapes, (9/10 lessons)

Previously met within Year 7 and KS2 National Curriculum:

KS2 curriculum – The following has been taught in Year 6, however properties of shapes are taught throughout KS2.

- Draw 2-D shapes using given dimensions and angles.
- Recognise, describe and build simple 3-D shapes, including making nets.
- Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons.
- Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.
- Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. Properties of triangles and quadrilaterals. **(Year 7, Sum 1)**

To be able to:

- Know names of 2D and 3D shapes.
- Recognise prisms (including language of edges and vertices).
- Accurate nets of cuboids and other 3D shapes.
- Sketch and recognise nets of cuboids and other 3D shapes.
- Plans and elevations.
- Find area of 2D shapes.
- Surface area of cubes and cuboids.
- Surface area of triangular prisms.
- Surface area of a cylinder.
- Volume of cubes and cuboids.
- Volume of other 3D shapes – prisms and cylinders.
- **Explore volumes of cones, pyramids and spheres.**

REMDINER – Strategies for teaching.

- For lower attaining pupils, try to use the shapes that we have in the stock cupboard to help them visualise the shapes. We also have multi-link cubes.

Links and interleaving

- Revisit estimation.
- Revisit rounding to nearest integer, decimal places, significant figures.
- Revisit unit conversions, including area and volume units.

Construction and congruency (9/10 lessons)

Pupils will not have congruency before and may not have used a compass before. Pupils have seen simple angle proofs **(Year 7, Sum 1)** and simple geometric proofs **(Year 8, Sum 1)** so please bear this in mind when approaching teaching this.

Previously met:

- Draw lines, angles and simple shapes **(Year 7, Sum 1)**.
- Parallel and perpendicular lines **(Year 7, Sum 1)**.

Skills/Assessment Objective Links

- Name and construct polygons (Year 7, Sum 1).

To be able to:

- Draw and measure angles.
- Construct and interpret scale drawings.
- Locus of distance from a point.
- Locus of distance from a straight line.
- Locus equidistant from two points.
- Construct a perpendicular bisector.
- Construct a perpendicular from a point.
- Construct a perpendicular to a point.
- Locus of distance from two lines.
- Construct an angle bisector.
- Construct triangles to given information.
- Identify congruent figures.
- Explore congruent triangles.
- Identify congruent triangles.

Links and interleaving

- Nets for 3D shapes.
- Scale drawings.
- Area of a triangles.

Number sense (3/4 lessons).

Previously met: See notes from KS2 National Curriculum

- Use the four operations with positive integers and decimals (Year 7, Spr 1)
- Add and subtract fractions including mixed numbers (Year 7, Spr 2)
- Multiply and dividing fractions (Year 8, Aut 1)
- Use factors and multiples (Year 7, Spr 1).
- Directed number (Year 7, Aut 1/Spr 2).
- Prime factorisation (Year 7, Sum 2).
- Write numbers in standard form (Year 8, Spr 2).

To be able to:

- Integers, real and rational numbers.
- **Understand and use surds.**
- Work with directed numbers.
- Solve problems with integers.
- Solve problems with decimals.
- HCF and LCM.
- Adding and subtracting fractions.
- Multiplying and dividing fractions.
- Solve problems with fractions.
- Numbers in standard form.

Links and interleaving

- Add and subtract fractions (lowest common multiple)
- Links to money and conversions when working with decimals.

	<ul style="list-style-type: none"> • Temperature and debt with directed number. • Multiplying fractions can be linked to fractions of amounts. • Index notation and Venn diagrams when revisiting HCF and LCM. <p>Consolidation: (3/4 lessons)</p> <p>This time can be used for the following:</p> <ul style="list-style-type: none"> • Catching up on any missed small steps. • Working through any of the suggested extension tasks below. • Working on any misconceptions which may have been identified with either the low stakes quizzes or the half termly assessments.
Spiritual, moral, social, and cultural development	<p>SMSC: Making choices, looking for patterns which may reflect the natural world, supporting and collaborating with each other, realisation that mathematics is an international language and making cultural links as we explore the history of mathematics.</p> <p>PSHE/British Values: Working collaboratively, being respectful during discussion and valuing contributions made by others</p> <p>Skills Builder: Key skills in numeracy used in all topic areas.</p>
Numeracy	Focus on key skills.
Literacy	<p>Vocabulary Tier 2: Command words displayed in the classroom and italicized/bold font used in shared resources/presentations. These are a constant focus in discussion and questioning,</p> <p>Vocabulary Tier 3: Title slide in all shared resource presentations show the key vocabulary for each topic.</p> <p>Reading: Underlining command words,</p> <p>Writing: Modelling solutions</p> <p>Oracy: Think, pair, share, discussion, verbal feedback (peer to peer), questioning, student modelling</p>
Becoming future ready	<p>Personal Skills: As a Mathematics student you will learn many skills: you will gain opportunities to listen to others supportively and to use questioning to develop your own understanding, you will learn how to cope with challenging questions and how to build up your resilience, you will get the chance to work on your own and with others. You will develop problem solving skills and you will learn how to break a problem down into smaller more manageable steps. You will learn how to collaborate with others when solving problems and you will learn how to articulate your solution to a problem.</p> <p>Employability: Mathematical skills are invaluable in the workplace. There are many transferable skills which are much valued by employers. Specific career paths for each topic are discussed at the beginning of each unit of work.</p>
Adaptation	<ul style="list-style-type: none"> • By progressive questioning: exploring pupils' understanding through interactive dialogue. • By outcome: different learners will produce different outcomes. • By resource: worksheets are clearly presented and accessible. • By intervention: by providing different levels of supervision and support. • By grouping/setting: according to prior attainment, gender, social preference, preferred learning style. • By offering optional activities: In class or as homework, to extend learning.
QFT/SEND Provision	
Implementation Curriculum Delivery	<p>Support (S), Core (C), Extension (E).</p> <p>Three dimensional shapes – small steps</p> <ul style="list-style-type: none"> • Know names of 2D and 3D shapes. (S) • Recognise prisms (including language of edges and vertices). (S) • Accurate nets of cuboids and other 3D shapes. (S) • Sketch and recognise nets of cuboids and other 3D shapes. (S) • Plans and elevations. (C) • Find area of 2D shapes. (S) • Surface area of cubes and cuboids. (S) • Surface area of triangular prisms. (C) • Surface area of a cylinder. (C)
Learning Outcomes (Most Powerful Knowledge)	

- Volume of cubes and cuboids. (S)
- Volume of other 3D shapes – prisms and cylinders. (C)
- **Explore volumes of cones, pyramids and spheres. (H)**

Extension tasks – These could be interleaved within the core knowledge.

- Surface area of any prism.
- Functional questions involving surface and volume.
- Problems which involve the pupils working backwards.

Construction and congruency – small steps

- Draw and measure angles. (S – This may take a couple of lessons).
- Draw circles and parts of a circle (S)
- Construct and interpret scale drawings. (C)
- Locus of distance from a point. (C)
- Locus of distance from a straight line. (C)
- Locus equidistant from two points. (C)
- Construct a perpendicular bisector. (C)
- Construct a perpendicular from a point. (C)
- Construct a perpendicular to a point. (C)
- Locus of distance from two lines. (C)
- Construct an angle bisector. (C)
- Construct triangles to given information. (S – This may take a couple of lessons)
- Identify congruent figures. (S)
- Explore congruent triangles. (S/C)
- Identify congruent triangles. (S/C)

Extension tasks

- Explore locus of paths.
- Proving congruency.

Number sense - small steps

- Integers, real and rational numbers. (C)
- **Understand and use surds. (E)**
- Work with directed numbers. (S)
- Solve problems with integers. (S)
- Solve problems with decimals. (C)
- HCF and LCM. (C)
- Adding and subtracting fractions. (S)
- Multiplying and dividing fractions. (C)
- Solve problems with fractions. (C)
- Numbers in standard form. (C)

Extension

- Further work with surds which may include expanding brackets with surds and rationalising simple fractions.

**Current learning
to be developed
in the future
within:**

Three dimensional shapes.

- Review area and circumference of a circle. **(Year 10, Spr 1)**
- Arc length **(Year 10, Spr 1)**
- Area of a sector **(Year 10, Spr 1)**
- Surface areas and volumes of cylinders, cones and spheres. **(Year 10, Spr 1)**
- Volume of a pyramid **(Year 11, Spr 1)**
- Plans and elevations **(Year 11, Spr 2)**

Construction and congruency

- Similarity and enlargement **(Year 10, Aut 2).**
- Parts of a circle **(Year 10, Spr 1)**
- Revisit loci **(Year 11, Spr 2)**

	<u>Number sense</u> <ul style="list-style-type: none"> • Work with exact answer (Year 10, Sum 1 and Sum 2) • Calculate with surds (Year 10, Sum 1 and Sum 2) • Calculate with standard form (Year 10, Sum 2) • Proving equivalence of different forms of number (Year 11, Spr 2) • Revisit KS3 number work (Year 10, Sum 1 and Year 11, Spr 1)
Assessment	Refer to assessment maps for formative and summative assessment opportunities.
Impact	Attainment and Progress – Refer to assessment results / data review documentation.